

SOFTWARE AND SUPPORT PRICING

WESTERN EUROPE 1989 - 1994

INPUT

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Market Analysis Programme—Europe

***Software and Support Pricing—
Western Europe, 1989-1994***

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Abstract

This report analyses the current software pricing and support mechanisms—for both systems and applications products—in place in Western Europe for midrange and minicomputer software. It describes the trends affecting application software support and maintenance over the next five years, particularly from the standpoint of the midsize and larger corporate users.

The critical role of modern information systems in the running of an organisation places increasing emphasis on the support and maintenance of software products. Equipment vendors have now started to integrate equipment maintenance and software support functions into combined offerings, thus placing competitive pressure on the independent software vendors.

Issues discussed in the report include pricing by processor power, bundling and unbundling of services, increased use of application products, and pricing trends as seen by both the vendor and the user. This report focuses on user requirements—both present and future—for software support and illustrates how vital it is for vendors to identify and satisfy key user needs.

The report contains 138 pages including 62 exhibits.



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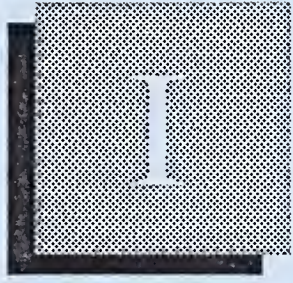
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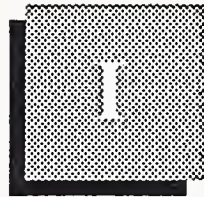
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Introduction





Introduction

A

Objectives of the Report

This study was produced by INPUT as part of its 1989 European research programme for software and professional services vendors, the Market Analysis Programme Europe.

The structuring and effective pricing of software support and maintenance services are perceived by vendor management as a critical ongoing management task in today's complex market environment. Seeing software support correctly integrated into the customer services function is increasingly important, due to factors that include:

- Pressure on hardware profit margins and the need for the total solution approach drive the hardware supplier to maximise involvement in software and service sectors
- The continual requirement for investment in product upgrades and renewals, due to changes in the equipment or operating software platforms upon which software modules must run
- The emergence of the open systems environment as an acceptable and viable alternative to the proprietary solutions that have dominated the market to date

The main objectives of this report are:

- To assist vendors to develop effective support pricing strategies for the 1990s
- To help vendor managements develop product support and maintenance strategies that complement their pricing policies

In this way product suppliers can go forward with a coherent marketing stance, tailored to their chosen sectors.

B

Scope and Methodology

The report addresses maintenance pricing and support issues related to midrange—minicomputer—and workstation-based software products, including both system and application software supplied by either equipment vendors or independent software product producers.

The thrust of the report is towards the midsize and larger corporate users, which are concerned about implementing distributed processing solutions with a high degree of extensibility to cater to expanding and evolving needs.

The geographic scope of the report covers Western Europe, which is broken down as follows:

- France
- West Germany
- United Kingdom
- Italy
- Scandinavia
- Rest of Europe (which includes the Benelux countries, Spain and Portugal, Switzerland, Austria, Ireland, and Greece).

Specific exclusions from the research scope of the report are:

- PC- and microcomputer-based products
- Consumer or home computer-based products

However, PC- and microcomputer-based products for the corporate and business market-places are included in the market sizing and forecasts given in Chapters III and VII.

Primary research that contributed to the analysis and conclusions in the report came from two main sources:

- Telephone interviews with 199 user representatives, who were either high-level managers in information systems departments (IS managers) or members of the line management at the subsidiary or departmental level in user companies. Of these, 172 responses from midrange users were used for analysis
- In-depth personal interviews with managers in 38 vendor companies, including equipment suppliers, systems integrators and independent software producers

Exhibit I-1 gives the breakdown of user interviews across the industry and country market sectors used, showing the actual totals in each category. The user sample analysed by size of establishment being interviewed was:

- More than 1,000 employees in the establishment: 86
- More than 500 but less than or equal to 1,000 employees: 86
- All establishments 172

EXHIBIT I-1

User Interview Sampling Frame

Number of Interviews	Industry Sector	Number of Interviews	Country Market
28	Manufacturing, Discrete	28	West Germany
24	Manufacturing, Process	40	France
38	Banking & Finance	29	United Kingdom
16	Insurance	15	Italy
16	Wholesale Distribution	17	Scandinavia (Sweden, Denmark & Norway)
15	Retail Distribution	21	Benelux (Belgium & Netherlands)
4	Transportation	-	
-	Central/Local Government	22	Rest of Europe (Spain)
13	Services	-	
17	Public Utilities	-	
1	Others	-	
172	Total	172	Total

The sample was thus evenly balanced between the two establishment staff size groups. This balance was achieved in order to cover the needs of both the midsize and the larger users.

Exhibit I-2 shows the breakdown of the vendor sample by type of supplier and the main markets covered. Thirteen of the 38 vendors offered products across the whole of Western Europe. Their maintenance and support policies varied little from country to country, and pricing was mainly geared to the prevailing currency exchange rates between their domestic and their overseas markets.

EXHIBIT I-2

Vendor Interview Programme			
Country. Markets Supplied	Number of Interviews by Type of Vendor		
	Equipment Suppliers and Integrators	Independent Software Suppliers	Total
France	3	5	8
United Kingdom	10	4	14
West Germany	-	3	3
Multinational	8	5	13
Total	21	17	38

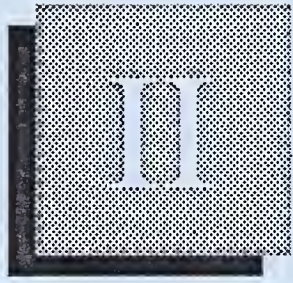
C

Report Structure

The report is organised as follows:

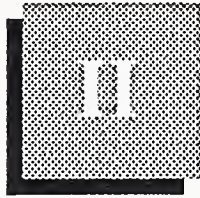
- Chapter II is an Executive Overview of the main points of the entire report.
- Chapter III contains an analytical overview of the software support and maintenance market-place, setting it in the context of the total IS (Information Systems) market.

- Chapter IV describes the current market status with respect to how users are charged for midrange and minicomputer software products. User attitudes and expectations and vendor responses are analysed. Differences between vendor practices and user requirements in four important subsegments of the market are analysed and described:
 - IBM midrange
 - DEC VAX area
 - High-performance workstations
 - The UNIX market
- Chapter V handles issues related to software product pricing and its relationship to support. The subject is first re-defined to match the needs of the current market, and then discussed in terms of the user-perceived tasks for which customer support is required.
- Chapter VI handles issues associated with central maintenance of software products:
 - Installation and warranty
 - Contract pricing
 - Hotline support
 - Patches and fixes
 - Upgrades and new versions
 - Product and documentation distribution
- Chapter VII contains a forward look at support trends and pricing structures and develops INPUT's conclusions for future opportunities becoming available to vendors over the 1989-1994 period. The chapter contains recommendations to vendors on the formulation of their maintenance and support strategies.
- Chapter VIII presents a detailed discussion of some of the major conclusions and observations of this study.



Executive Overview





Executive Overview

A

Software Support— A Key Challenge

The criticality of modern information systems to the running of an organisation places increasing emphasis on the support and maintenance of software. The size and complexity of this subject necessitates a focused approach. In this report, INPUT has concentrated on the particular challenges to be faced in the midrange area. The principal contents of this research study are summarised in Exhibit II-1.

EXHIBIT II-1

Software Support and Pricing Challenges

- Midrange market characteristics
- Support trends
 - Contract terms
 - Contract features
 - Support needs
- Opportunities
 - Support strategy
 - Pricing mechanism

In this report INPUT studies midrange subsectors that have strong growth potential and discusses the lessons on software provision and maintenance that can be learned for the immediate and longer-term future. The segments studied are:

- The IBM AS/400 and System 3X Series
- The midrange Digital VAX and VAX workstations area
- High-performance desktop and desktide workstations

This report examines the overall characteristics of the software product support environment. It discusses the overall size of the market in relation to other sectors of the industry and analyses how the market is structured between systems and applications software. Other important characteristics of the market are the relative positions of IBM and Digital proprietary systems to the growing threat from nonproprietary systems, notably UNIX.

The report analyses the current software pricing and support mechanisms in place in Western Europe. It describes the trends affecting application software support and maintenance over the next five years, particularly from the standpoint of the midsize and larger corporate users. Pricing by processor power and the bundling and unbundling of services are discussed. The increased use of application products raises particular support and maintenance needs for the user.

These support needs present computer software and services vendors with considerable levels of opportunity. The report focuses on these opportunities and their requirements, both present and future, and describes how vital it is for vendors to identify and satisfy these key user needs. The report also provides recommendations, based on the analysis of current methods for future support strategy and the software support pricing mechanism that are most likely to succeed in the market-place.

B

The European Computer Market

In the European computer market, software and services together already exceed the expenditure on equipment. The current structure of the market, analysed in this component form is shown in Exhibit II-2. The software products sector is the smallest of the three sectors, but it is the fastest-growing segment. The services sector contains the customer services (equipment maintenance) subsector which is effectively static, thus emphasising the high growth of the professional services element that accounts for the bulk of the revenue.

The percentage share of the market represented by equipment is shrinking. In 1989, it will drop from around 45% to fall below 40% by 1994. This forecast shift in the balance of information system and service components clearly underlines why equipment vendors are increasingly placing more emphasis on selling service solutions.

INPUT's market assessment measures delivery modes, an assessment of the way software and services are bought from an end-user perspective. A number of these modes, turnkey systems and systems integration in particular, are combinations of equipment, software products and professional services. Vendors faced with increasing market pressure for solutions must judge the competing claims of these different types of service solutions:

- To sell software application products independently of any other service product except for the professional services support of those products
- To provide those software product applications, together with the necessary equipment and services, as a combined turnkey package
- To be a developer of custom-designed software, which could be included within an overall systems integration contract containing the necessary equipment

Exhibit II-3 shows a further level of analysis for that part of the software product market-place that is sold independently of equipment. This portion represents some \$14 billion of the \$17 billion shown in Exhibit II-2. As shown in Exhibit II-3, system software outweighs application products. Software support is clearly shown to be an important ancillary revenue stream, nearly \$2 billion in revenue in 1989, which is expected to grow at a faster rate than the products upon which it is based.

EXHIBIT II-2

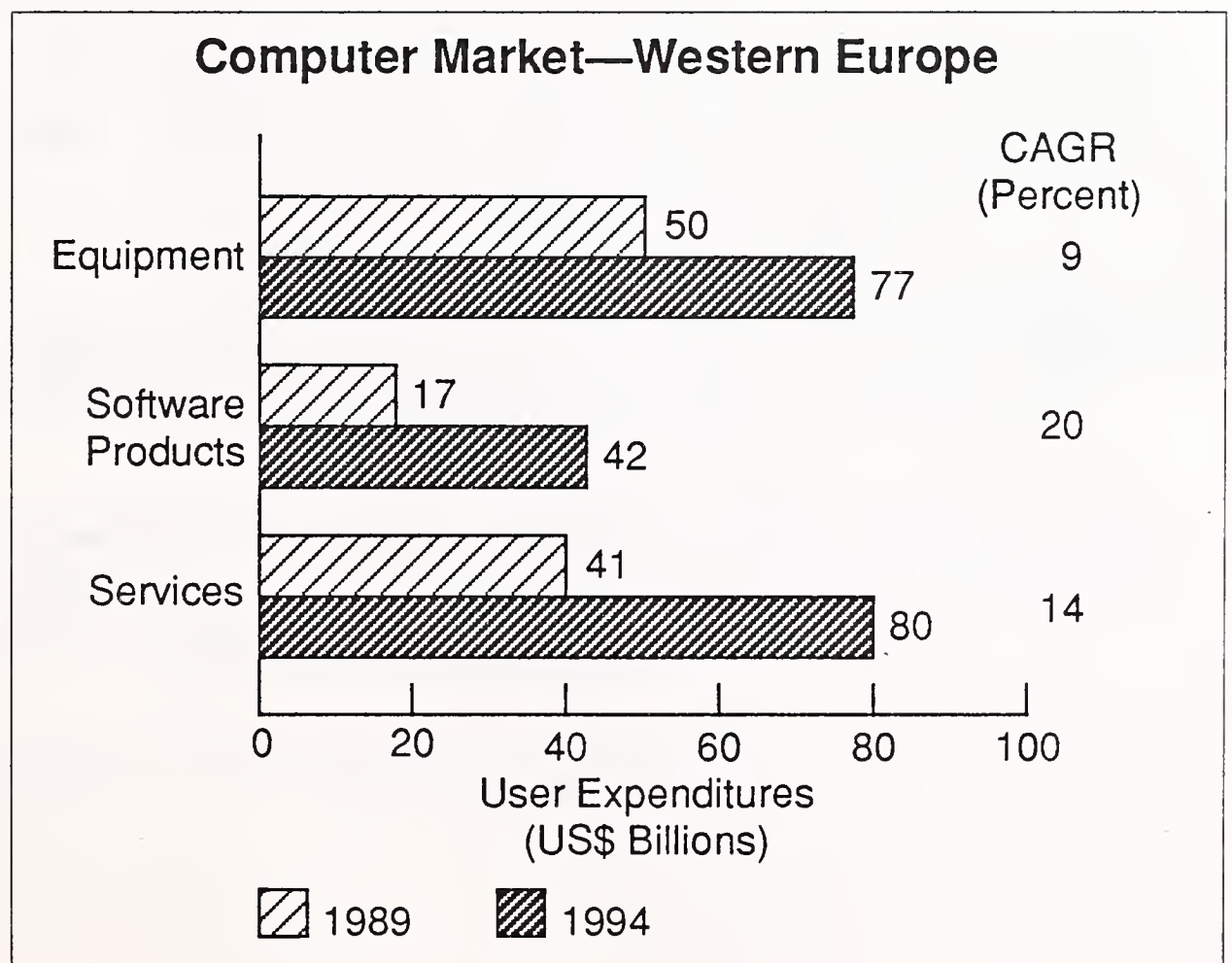
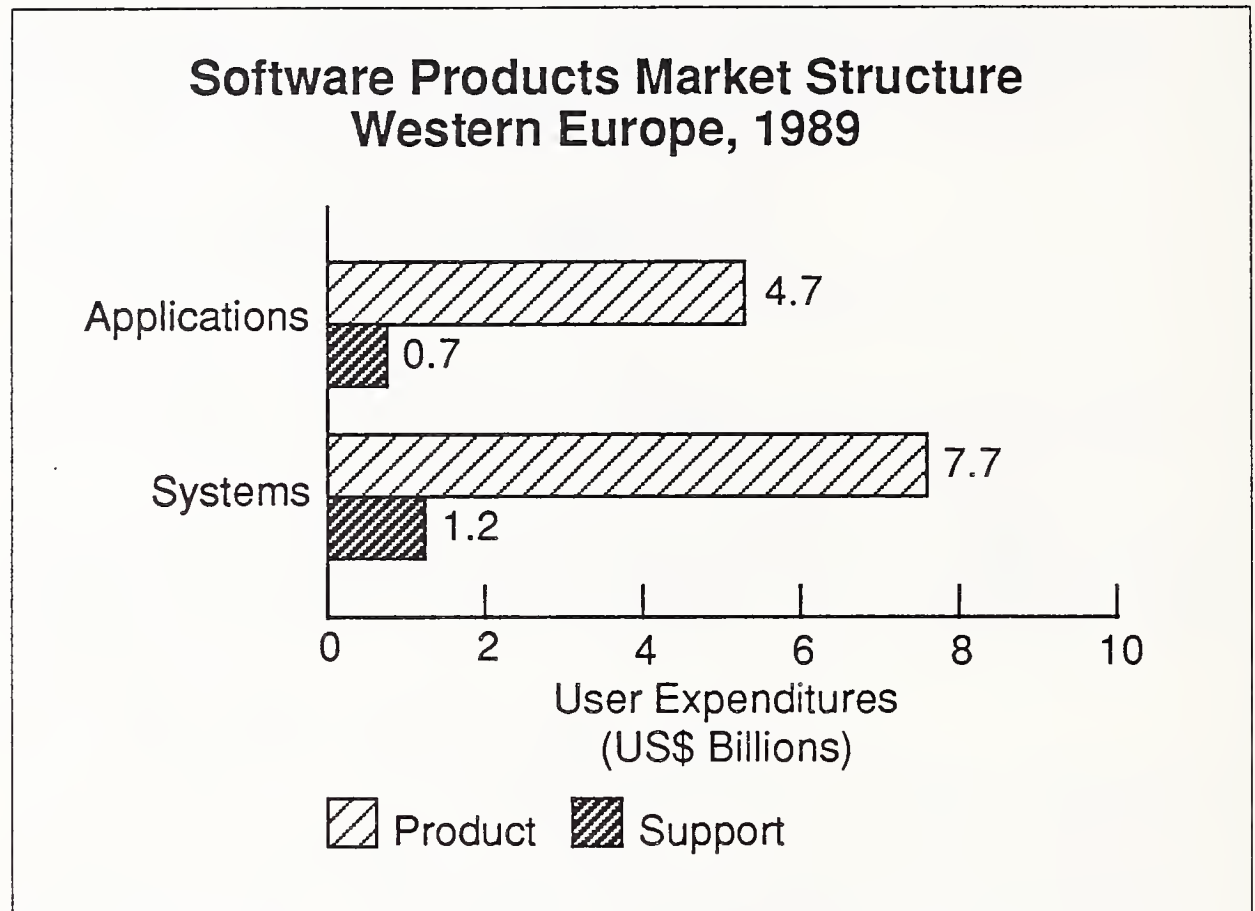


EXHIBIT II-3



Software products are sold by both equipment vendors and independent vendors, and a clear bias exists between these two groups for system and application software:

- Equipment vendors account for some 80% of the system software market.
- Independent vendors account for some 60% of the application software market.

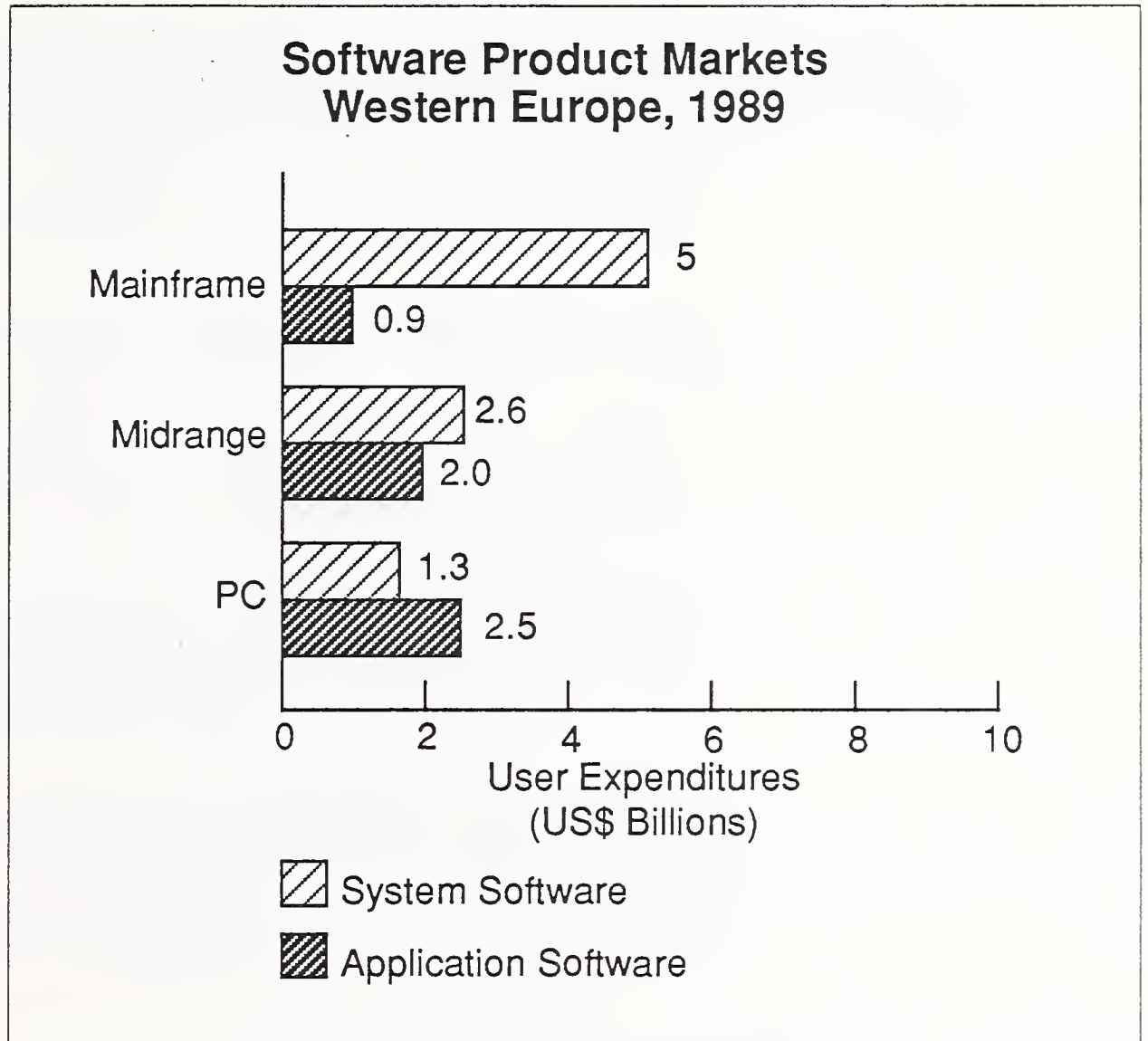
C

Software Product Market Segments

This report places particular emphasis on the growing importance of the midrange system. Exhibit II-4 shows INPUT's segmentation of the software products market. Trends that emphasise the importance of this sector include:

- Cooperative networked computing becoming commonplace
- Departmental office automation becoming an active ingredient in proactive corporate information systems
- The mainframe adopting the role of a server—whether for a database, a network or an application

EXHIBIT II-4



Although the applications sector is fairly evenly divided between mainframe, midrange and the PC sectors, the bias in system software is very much towards the mainframe. This bias is of course partly accounted for by the inclusion of database and generic business packages (spreadsheets and word processing) in the application sector for PCs.

Another factor that should also be taken into account in interpreting Exhibit II-4 is the understatement of the midrange application market, which results from the separate identification of the turnkey sector.

For the purposes of this report, INPUT has adopted an empirical definition of the midrange that excludes the desktop PC and consumer computing markets at the bottom end and the large centralised mainframe markets at the top end.

D**Key Operating System Environments**

In order to deal adequately with such a complex subject as the software products market-place, INPUT has chosen to examine four subsectors:

- The IBM midrange including AS/400 and the System 3X series that it replaces
- The Digital midrange VAX and VAX workstations area
- High-performance desktop and desktide workstations, often used for technical and engineering computer-intensive applications and increasingly run, as a result of Sun Microsystems' sector leadership, under the UNIX operating system
- The rest of the nonproprietary operating systems sectors including UNIX, PICK, and MUMPS (but excluding MS-DOS and the emerging OS/2 as essentially related to desktop single-user applications)

An overview of the software environment by users of IBM midrange systems is shown in simplified form in Exhibit II-5. It is an analysis of the midrange software directory held by IBM in the U.K. in its National Solutions Centre database. Although this is not a qualitative analysis, it provides a broad picture of the extent of the available software inventory.

EXHIBIT II-5

IBM Software Directory Midrange Systems

	Estimated Number of Products	
	IBM	Independent
Systems	50	50
Applications		
- XI	25	300
- IS	5	800

(One European national market)

System software choices are relatively limited, with IBM itself only offering about 50 product lines. On the applications side the choice is much wider, but it is noticeable that IBM offers only a relative handful of products, but it does include major software products such as Office Vision/400 for office automation and MAAPICS for the manufacturing industry.

Using this one-country position, INPUT has estimated that across the whole of Western Europe, between 500 and 600 software companies and agents are actively promoting more than 5,000 IBM midrange application products.

The software environment for Digital is indicated in Exhibit II-6, which shows the analysis of the worldwide software service catalogue for the VAX range. Over 4,000 products are being supported in a growing revenue stream. Comparing and contrasting it with the previous table, which showed the IBM midrange's equivalent position, we can note the following differences and similarities:

- The IBM catalogue included a majority of programs that are only available in one major European country market. Grossing up from this case to the whole of Europe would entail an analysis of a similar number of products to those in Digital's catalogue.

EXHIBIT II-6

Digital Software Catalogue VAX Systems

	Estimated Number of Products	
	Digital	Independent
Systems	250	880
Applications		
- XI	65	1,600
- IS	40	1,300

- IBM's catalogue shows a majority of products in the industry-specific application sector, Digital's in the cross-industry sector. IBM, in its midrange, is concentrating on commercial applications in which the greater the specificity of the product the greater the potential competitive advantage or value added (see Chapter III for the discussion on generic and germane software). Digital, on the other hand, also serves its technical and scientific user base with a wide range of cross-industry engineering and research applications.
- Both catalogues show that the manufacturers' involvement in application programs, as evidenced by numbers of products, is slight. However, systems that are marketed include jointly sold products under various cooperative marketing schemes.

Exhibit II-7 shows an analysis of a typical software catalogue for UNIX products as offered by one of the major equipment suppliers. The catalogue still only runs to hundreds of products, whereas around 1,000 are estimated by INPUT to be available in each major country in Europe for all UNIX systems.

EXHIBIT II-7

UNIX Software Catalogue — A Major Equipment Vendor

	Estimated Number of Products	
	Digital	Independent
Systems	40	35
Applications		
- XI	10	190
- IS	-	70

E

UNIX—The Market Impact

When the software product analysis described in Section D above is combined with an analysis of the market shares for the principal midrange software products markets, namely those for IBM, Digital and UNIX, the significance of the UNIX phenomenon can be readily identified, as shown in Exhibit II-8.

EXHIBIT II-8

Midrange Market Structure

Operating Environment	Market Share (Percent)
IBM	23
Digital	29
Other proprietary	26
Nonproprietary	22

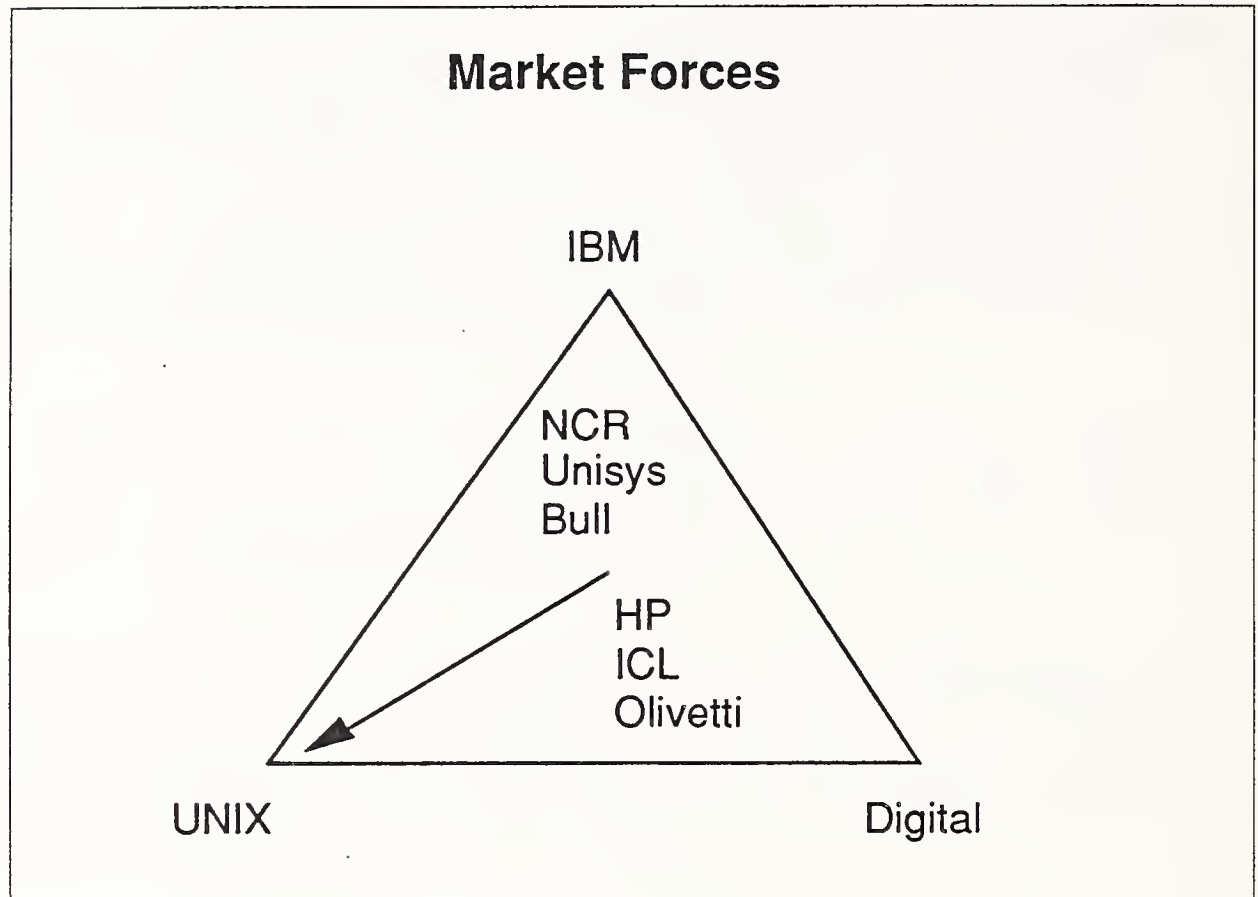
The midrange software products market can be considered to break down into four broad areas roughly equal in size: the IBM and Digital midrange product areas accounting for just over one-half of the market, and the remainder shared between the nonproprietary systems area (dominated by UNIX products) and all other proprietary systems. All other proprietary systems products must thus compete in just one-quarter of the total market.

The squeeze on the market share of these other systems is further evidenced by the growth rates observed for UNIX software product vendors. In overall terms, INPUT estimates that this market sector is growing at 30% to 40% per annum in revenue terms. Individually, it is only the IBM and Digital proprietary systems that have sufficient market position to compete effectively for software product development funds.

The strong attraction of UNIX to software product developers and equipment vendors can be encapsulated in diagrammatic form as shown in Exhibit II-9. In the midrange software product market exist three focal points for software product development and investment—IBM, Digital and UNIX.

It is these market forces which are leading to software products (and not equipment products) becoming the most important delivery element. System vendors cannot meet client solution needs in the midrange sector without a rich software product environment, and increasingly this is implying application as well as system software products. This further implies the growing importance of independent software vendors to support the market.

EXHIBIT II-9

**F****Software Charging Strategies**

The way software products are sold and charged for is a very important, but of course also a very complex area. It is necessary to distinguish between two aspects:

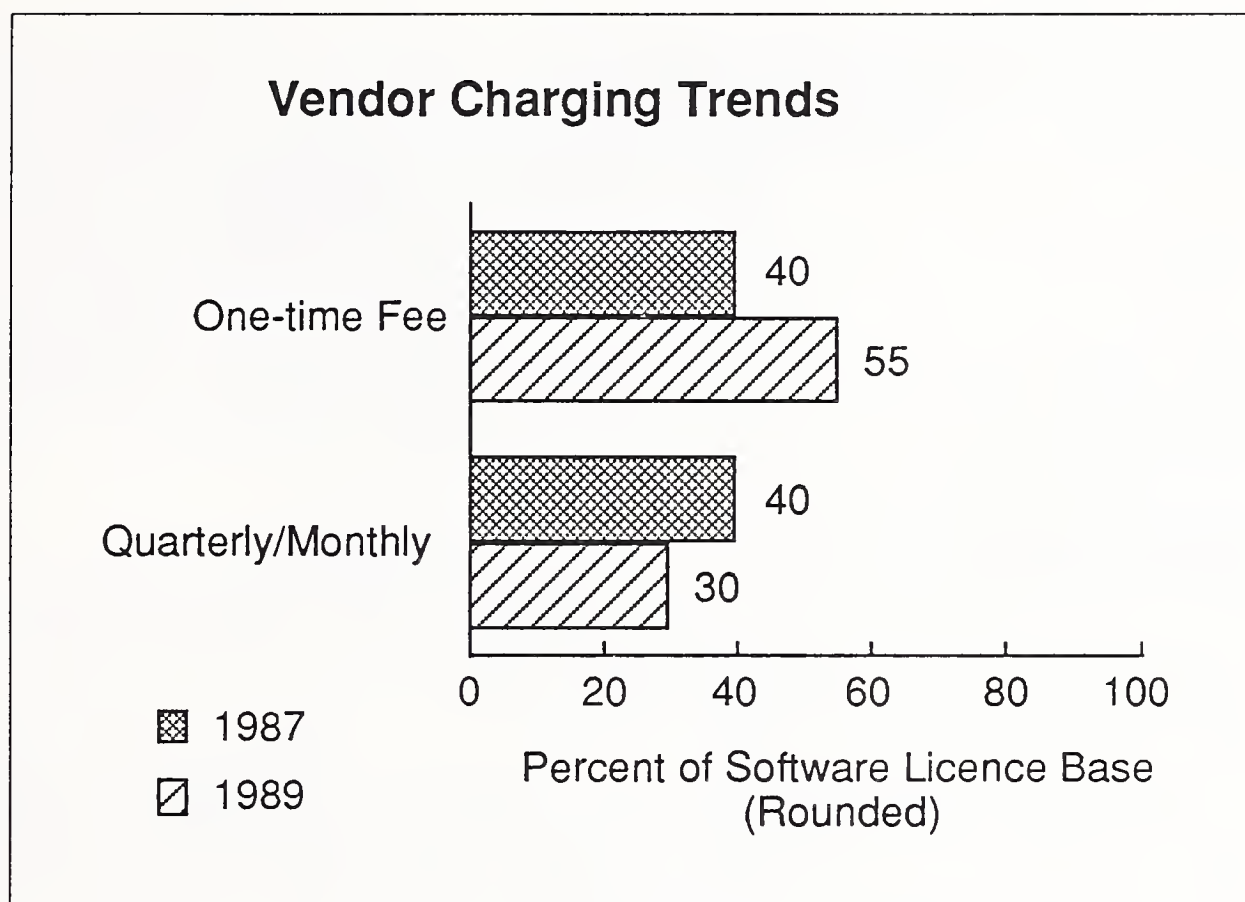
- The charging methods
- The tariff structure

Two licencing periods are found in the market: short-term licences, typically for anything between two and five years; and perpetual licenses for permanent use. There exist a number of different charging methods, but the most widely used are:

- One-time fee—An initial fee giving the purchaser rights to use the product over the agreed licence period
- Regular licence fee—Most frequently, quarterly or monthly fees

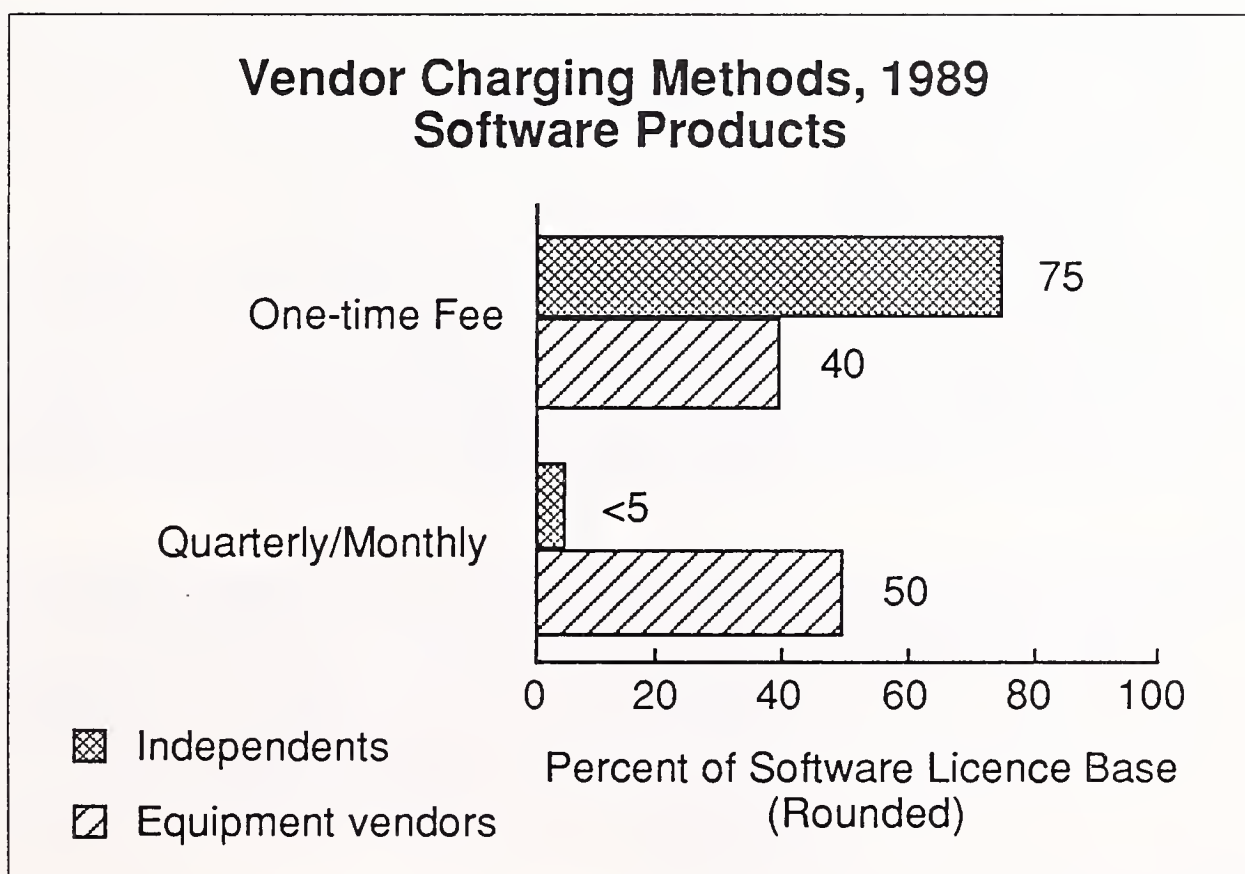
Exhibit II-10 illustrates the principal trends with regard to these charging methods observable in the market-place over the last two years. There has been an increase in the number of software products being charged for on a one-time fee basis and a corresponding decrease in the usage of the regular licence fee method.

EXHIBIT II-10



The analysis between the methods utilised by independent software vendors and the equipment vendors is shown as Exhibit II-11. It can clearly be seen that it is the independent vendors who overwhelmingly favour the one-time fee approach. The equipment vendors have a stronger (though falling) bias towards quarterly or monthly fees. Until 1986, the quarterly fees method was IBM's principal charging method.

EXHIBIT II-11



G

Application Product Support

One of the major challenges to software products vendors is the provision of support. For application software in particular there seems to be a high incidence of in-house support in the midrange sector. The analysis shown in Exhibit II-12 indicates not only the considerable opportunity that exists for the provision of third-party application support services but also the considerable variations that exist between the different country markets of Western Europe. The trend towards seeking more outside support services is evident in both France and the U.K.

EXHIBIT II-12

Application Maintenance Sources

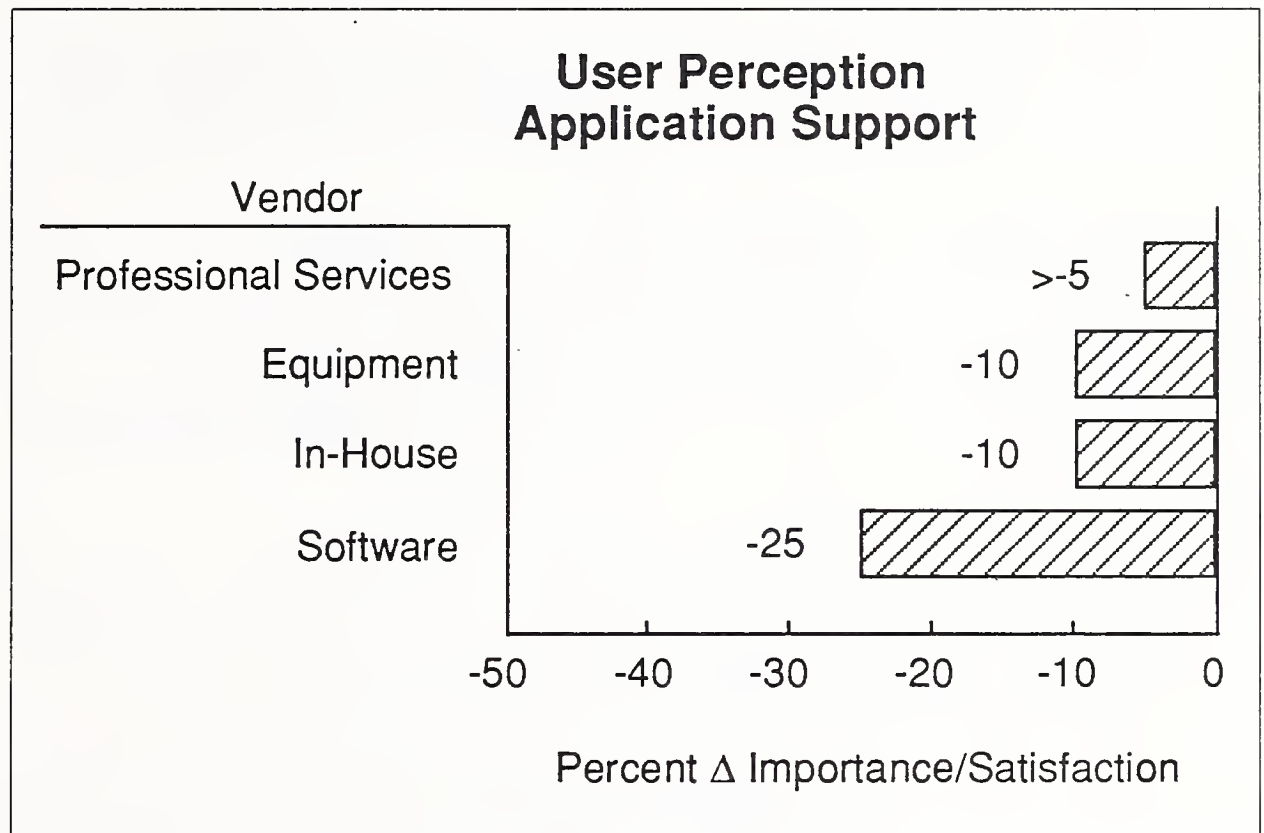
	In-House	Equipment Vendor	Software Vendor	Professional Services Vendor
Germany	45	30	20	-
France	35	45	5	15
U.K.	40	20	10	25
Italy	50	10	35	5

Percent rounded
Sample Error +/- 5%

The user perception of the degree of satisfaction obtained from the various sources of application product support and maintenance can be gauged from the analysis shown in Exhibit II-13. This diagram uses the difference between recorded user importance and user satisfaction (Δ importance/satisfaction) as a measure of the effectiveness of services received from different sources.

Overall, the importance ratings recorded were, not surprisingly, high with a shortfall of satisfaction being recorded of about 10%. Exhibit II-13 indicates, however, a considerable disparity between the degrees of satisfaction recorded for different sources of vendor-supplied application product support. Software product vendors were clearly rated the least satisfactory, thus indicating the need for this group of vendors to address the issue.

EXHIBIT II-13



However, to put this analysis into perspective, it should be pointed out that almost two-thirds of the users interviewed for this research claimed to have no major problem. The areas signalled as having problems were most typically:

- Response time from problem notification
- Repair and fix times
- Software performance and functionality

The features included in software application product support and maintenance contracts show some interesting trends between INPUT's 1987 and 1989 market surveys. Exhibit II-14 lists the support features that have increased most markedly, together with the relevant percentage occurrence for 1987 and 1989. The increase in fault reporting only indicates a need to limit the level of support and maintenance provided for some products in the market. The discounting of enhancements is evidence that vendors fully appreciate the lower costs of sale to existing clients. The increase in consulting represents the user's growing need for additional support and for more complete and consequently more complex system solutions.

One further area, not recorded in INPUT's 1987 survey but now featured in over 40% of user's contracts, was the Problems Database Access feature in which the vendor makes available his own trouble-shooting expertise.

EXHIBIT II-14

Applications Support Contracts

Feature	Percent 1987-1989
Fault reporting only	35/55
Discounted enhancements	35/55
Consulting	50/65

In general, all support features have, since the 1987 survey and with the exception of remote diagnostics, increased their penetration, thus indicating the increased formalisation surrounding application software product support.

H**Opportunities**

The development of the software products maintenance market is creating new opportunities for service vendors. The principal driving forces that are leading to these new opportunities are the growth of the installed base of information systems, the increasing use of the application package approval and the increased reliance which users now place on their information systems to aid in the running of their organisations. The principal potential inhibiting factor to his market growth will be the bundling of product support and maintenance into system contracts.

Two important areas of opportunity are emerging:

- IMSE
- Third-party maintenance

The new term IMSE (Integrated Maintenance Support Environment) has now been coined to complement IPSE (Integrated Project Support Environment). Savings in maintenance costs have been often promoted as a spin-off benefit of utilising the methodologies and tools that can be broadly clarified within the IPSE or CASE (computer aided software engineering) umbrella terms. However, it is only reverse engineering tools, which have been designed initially to allow for the examination and restructuring of code, that really address the maintenance portion of the life-cycle. At this stage of development, it is not clear how IMSEs will be manifested or what relationship they should or will have to IPSEs.

Nevertheless, increasing attention should be paid to software maintenance; and the question of how users are organised for this activity will be key to the successful marketing and management of support services.

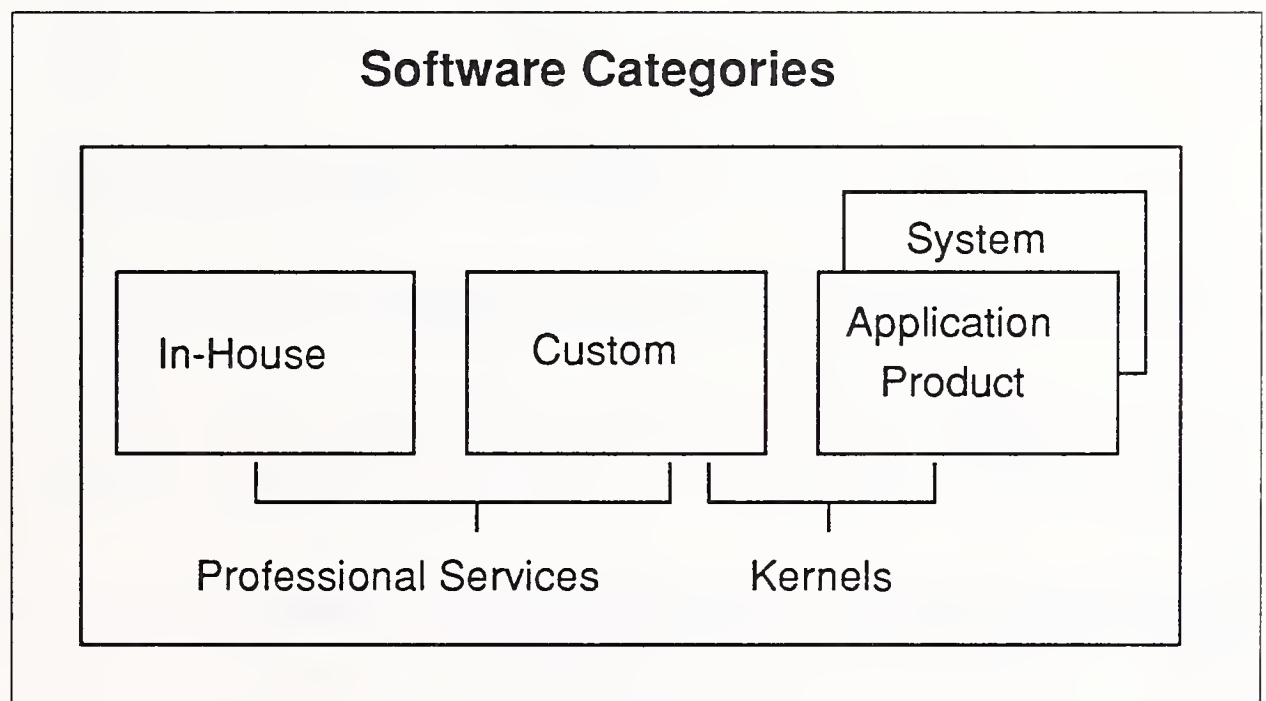
The sheer size and importance of the software maintenance activity, particularly that related to in-house developed code, is creating interest and activity in the third-party software maintenance area. Thus this market opportunity, discussed in the next section, extends across not only the support of software products but also the maintenance and support of custom-built applications.

I

Software Maintenance Potential

In order to correctly position and size the various levels of opportunity available in the provision of third-party maintenance and support services, it is first necessary to define the different software groups potentially requiring that support. The four major software categories are shown in Exhibit II-15.

EXHIBIT II-15



Clearly, custom-designed software can be developed in-house or through the medium of a professional services contract; and both offer the opportunity for maintenance and support to be potentially provided on a third-party basis.

The distinction between contracted custom-built systems and application products is blurred by the concept of 'kernel' systems. Similarly, the support and maintenance of these categories of software is blurred in definitional terms, but this does nothing to blunt the service opportunity. Clearly, generic system software also presents a third-party support opportunity, although of course this is the area most vulnerable to support bundling.

The size of the software maintenance market potential can be gauged from the estimates shown in Exhibit II-16. The in-house maintenance market (an INPUT estimate of user total expenditures on staff for this activity) is of the same order of magnitude as that spent on development. It can clearly be seen to swamp the external third-party market, particularly in the area of maintenance and support. INPUT expects to see considerable development of the third-party maintenance and support market for in-house developed software over the next five years.

EXHIBIT II-16

Software Maintenance Potential (1988 US\$ Billions)		
Category	Development	Maintenance/ Support
In-house	23.2	18.5
Custom	9.1	1.6
Application product	3.8	0.5
System product	6.3	1.0

J

Future Challenges

The support and maintenance issues facing a vendor remain essentially the same as always:

- To optimise software products and their prices to meet market conditions
- To develop software product support contracts that are justified by the service requirements

Vendors will need to pay increasing attention to the development of differing levels of service and support contracts. Additionally, professional services can be developed to cover those elements of service that are less clearly allied with products or that address custom-developed systems.

INPUT recommends that the key principle of simplicity be applied to the whole area of pricing and support which should be considered as two closely connected areas and not as separate issues. The vendor must develop a coherent overall strategy clearly aimed at meeting user needs. Thus, tactical bundling and unbundling, for example, must be carried out within a strategy framework to avoid both internal and external confusion.

This overall strategy should also clearly distinguish maintenance of software products, support of products for customers on an individual basis and additional professional services. The strategic implication of open systems on existing pricing and support policies will also be an important consideration, as will discounting policies.

INPUT's overall recommendation for a software product support pricing mechanism, summarised in Exhibit II-17, can be described as follows:

- Unbundle the functionality of products, but bundle into them the maintenance and support.
- Develop a two-tier licence fee in which:
 - The first year fee level is set to cover initial development and implementation costs
 - The second and subsequent years fee level covers the costs of on-going customer support and product enhancement

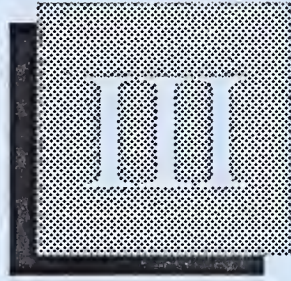
This two-level structure allows the vendor to offer a perpetual contract period for the use of the software, thus emphasising commitment to the users and their systems.

- Restrict discounting to that done by number of modules. Discounting policies, not carefully planned as part of the overall strategy can lead to considerable confusion and loss of revenue.

EXHIBIT II-17

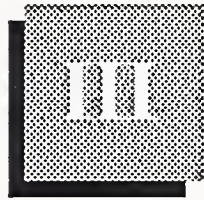
Software Product Pricing Mechanism

Payment method	2-level fee
Contract period	Perpetual
Discount policy	Number of modules



Market Overview





Market Overview

The software products sector has an ancillary revenue stream consisting of the maintenance and support revenues obtained from ongoing maintenance contracts and from ad hoc support activities. Although this revenue stream in Western Europe is on an order of magnitude smaller than its parent stream—from software product licences—it is significant (it was greater than \$1 billion in 1988) and is growing as the installed base of software products increases.

The objectives of this overview chapter are:

- To categorise the software products market-place in terms of the different classes of software and the different hardware platforms
- To set the two revenue streams into the context of the overall information services market in Europe in order to judge the competing claims of the different types of services solutions. Custom-developed software systems and turnkey systems offer both threats and opportunities to the software product sector: threats as rival solution types, and opportunities as segments require software products as internal components or 'kernels' of their design structure.
- To produce a European market sizing for product maintenance and support

A

Software Product Categories

Exhibit III-1 shows INPUT's formal classification of software products in a hierarchical manner with systems and applications being the main split, and application development tools increasingly coming to play the interfacing role between these two main categories of software in individual system situations.

EXHIBIT III-1

Software Products Market Structure

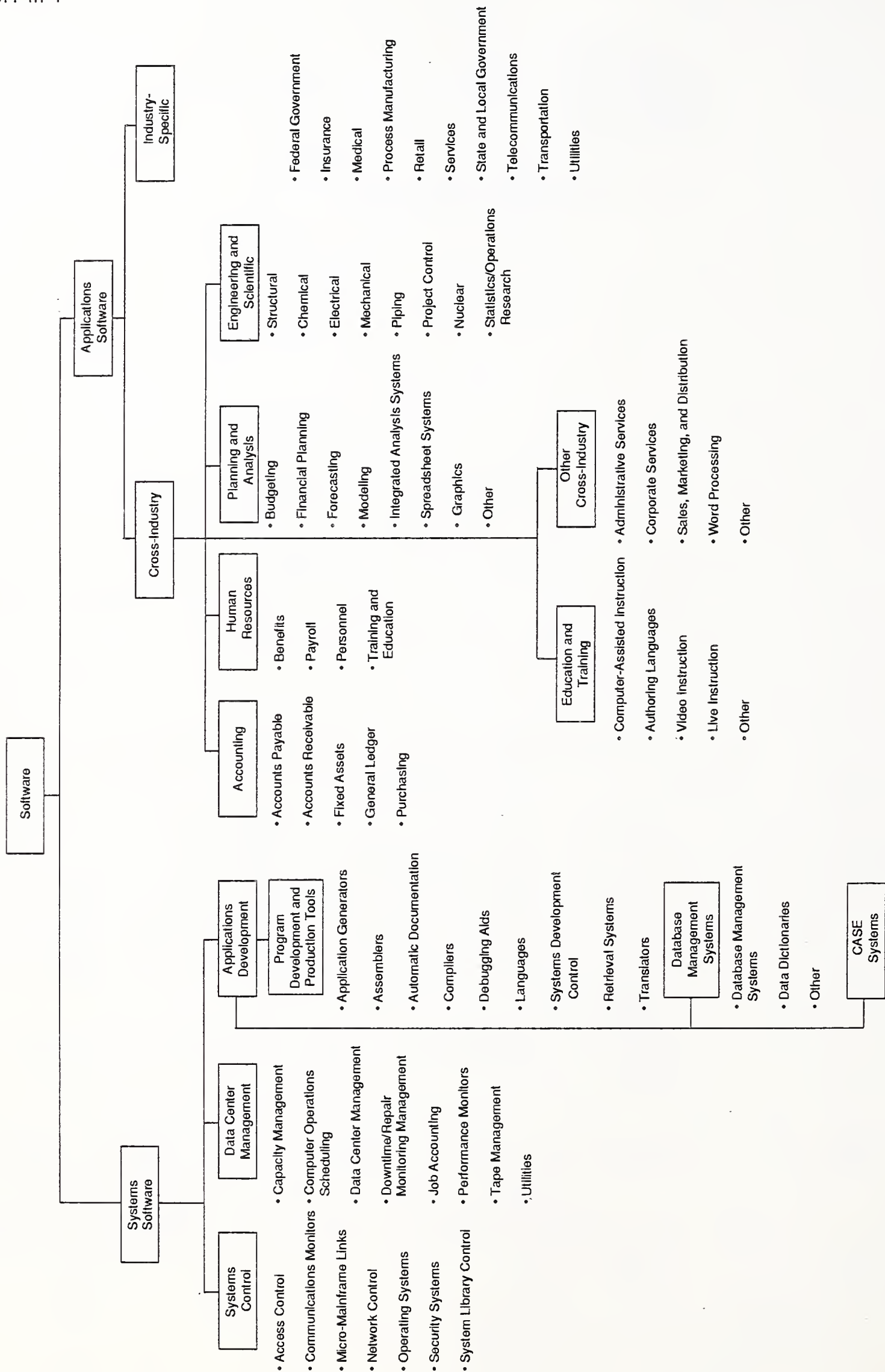



Exhibit III-2 illustrates a layered approach to categorising software products. Its tabular form shows the different layers of standard software now required for most general-purpose systems as the different rows of the table.

EXHIBIT III-2

Definitional Map of Software Classes

Category of Software	Type of Platform			
	Mainframe	Midrange	Workstation	PC/Micro
Operating System	S	S	S	S
Utilities	S	S	S	S
Languages & Development Tools	S	S	S	S
Database Products	S	S	S	A
Business Software	A	A	A	A
Application Packages	A	A	A	A
Other (e.g., bespoke)	A or S	A or S	A or S	A or S



 Generic Software

 Germane Software

Key: S Indicates System Software

A Indicates Application Software

As one moves down the table, the category of software indicated gets closer to the user and his application. As one moves up the table, the software type becomes more related to the equipment platform.

The four columns show four distinct hardware platforms categorised by size and use:

- For the purposes of this report, the midrange category has been separated out from the mainframe/minicomputer category used in INPUT's

previous reports (*The Western European Market for Computer Software and Services, 1988-1993* or *Software Product Pricing and Support Strategies in Europe, 1987-1992*). It is defined to include IBM's System 3X systems and their replacement, the AS/400; Digital's MicroVAX and VAX Server ranges; and the equivalent competitive offerings from the other hardware manufacturers, including the majority of systems based on the UNIX and PICK nonproprietary operating systems.

- The workstation segment is another new platform category broken out from the earlier categories. It includes high-performance desktop or desktide configurations, such as those provided by Sun Microsystems, Hewlett-Packard (Apollo), and Digital. Although configured either as stand-alone or networked, they are distinguished from the midrange systems category by application (today, they are still used predominantly in technical applications) and by architectural pedigree (they were initially developed as high-performance single-user engines capable of cooperative networking).
- The line between system and application software is usually drawn between database management systems (DBMS) products for all platforms except the PC, where the parameterised DBMS often becomes the application engine itself. The business software category includes products like spreadsheets, word processing and office automation.

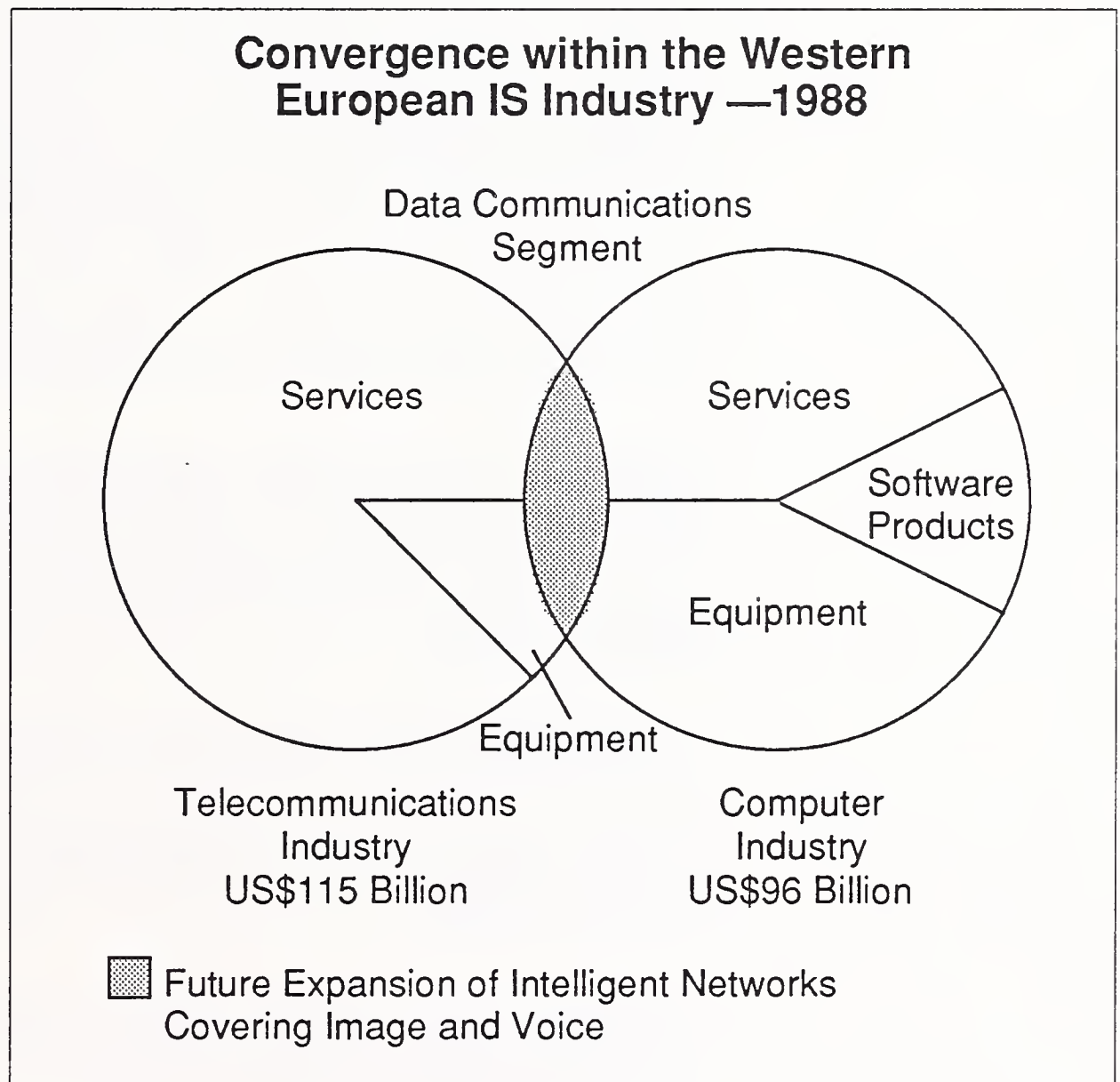
Another distinction emphasised by the chart is that between generic and germane software:

- Generic software is defined as software that is available on the open market and, because it can be incorporated in any organisation's system, cannot add to an organisation's competitive edge. At best, an organisation can keep up with its rivals/peers by using the best generic software available in the best way for its business. Examples of generic software are the MVS Operating System and any of the leading word processing packages.
- Germane software, on the other hand, can add to an organisation's competitive edge because it has been designed with the organisation's requirements in mind. Examples of germane software are in-house developed application systems and general software packages that have been designed to make them work to the specific requirements of one organisation.
- As packages become more sophisticated, the distinction between generic and germane software moves away from the equipment platform and towards the user. It is currently situated somewhere in the upper half of the applications package sector.

B**Information Systems
Market**

As is illustrated in Exhibit III-3, which shows the increasing convergence of data processing and telecommunications, the permeation of intelligence into networks of distributed and centralised systems means an increasing flow of software into products and embedded forms into the telecommunications sector.

EXHIBIT III-3



In the computer sector, services and software together already outweigh the equipment expenditures by approximately 55:45. In the telecommunications sector, services (dominated by line rentals and call charges) outweigh equipment in an even higher ratio, nearer to 80:20. In the overlap between the two sectors, the data communications segment is still relatively small at \$14 billion in 1988 and is split in favour of equipment in a ratio of 60:40.

The integration of image and voice into corporate and public networks over the next five years will fuel the requirement for further standard

software products to drive the systems and to implement standard business applications in cooperative processing office environments. Increasingly, products will be required to operate in open systems environments, and the spread of these environments (even when hosted within proprietary operating systems (such as AIX running under VM or ULTRIX under VMS) will encourage software authors and authoring companies to build products for the larger installed bases of users, which will be available with an open systems market. Already in 1989, hardware suppliers that can offer catalogues of several hundred products out of the 1,000 or so currently available under UNIX are doing so. Some new entrants to the UNIX equipment market do not see a need to provide specific application products, once the basic requirements for a choice of DBMS and good business software for office applications have been satisfied. The larger, more complex and more specific applications are increasingly the province of the independent supplier.

The faster than average (for the industry) growth of the software products sector in 1989 is being outstripped by that for product support and maintenance.

Exhibit III-4 shows INPUT's analysis of the European market in greater detail, and includes the forecast short-term and five-year growth rates used to derive INPUT's top-level forecasts for 1994. The market is broken into four major segments, whose constituent subsegments are defined as follows:

- Computer equipment—Mainframe, midrange, PC and workstations, and peripherals (excluding telecommunications-related peripherals)
- Equipment-related services—Hardware and system software maintenance, professional services, disaster recovery service and system software licences
- Application-related services—Application software products, licences and maintenance, professional services, systems integration, turnkey systems, processing and network services
- Data communications—Equipment and maintenance services

From this analysis, it is possible to compare the relative percentages of equipment and software products and services, grouping the elements from the different major segments as follows:

- Software products, including licence fees and support and maintenance charges, will rise in percentage terms from 16% in 1989 to 21% in 1994, principally at the expense of equipment expenditures, with services remaining fairly constant at around 40% of the market

EXHIBIT III-4

European IS Market by Major Sectors, 1988-1994

Sector	Market Size (in Constant 1988 U.S. Dollars)							
	1988		CAGR 1989/ 1988 (Percent)	1989		CAGR 1994/ 1989 (Percent)	1994	
	\$US Billions	Percent		\$US Billions	Percent		\$US Billions	Percent
Computer Equipment (1)	37	39	8	40	38	8	59	30
Equipment-Related Services (2)	20	21	13	23	21	15	47	23
Application-Related Services (3)	30	31	15	35	32	16	75	38
Data Communications (4)	9	9	11	10	9	12	18	9
Total IS Market	96	100	12	108	100	13	200	100
- Equipment	46	48	9	50	46	9	77	39
- Software	14	15	21	17	16	20	42	21
- Services	36	37	14	41	38	14	80	40

(1) Mainframe, midrange, PC/workstations, peripherals (except telecommunications)

(2) Equipment and system software maintenance, professional services, DRS, system software licences

(3) Application software products/licences and maintenance, professional services, systems integration, turnkey systems, processing services, network services

(4) Equipment

- Software products growth is at 20% per annum, the highest of the three elements

C

Markets for Software
Products and Their
Maintenance

Exhibit III-5 shows the breakdown of the 1988 market in Western Europe between product licences and support and maintenance. Out of the total market of \$14.2 billion, about \$12.4 billion was spent on licences and \$1.8 billion on support and maintenance.

EXHIBIT III-5

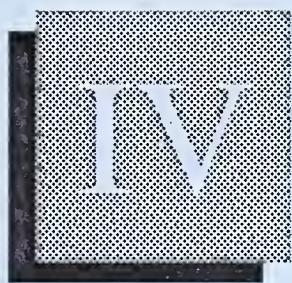
Western European Software and Software Maintenance Market, 1989

Software Product Segment	\$US Billions		
	Equipment Vendors	Independent Vendors	Total
Licences			
System Software	6.27	1.42	7.69
Application Software	1.33	3.40	4.73
Total	7.60	4.82	12.42
Maintenance & Support			
System Software	0.97	0.21	1.18
Application Software	0.18	0.47	0.65
Total	1.15	0.68	1.83
Total Systems	7.24	1.63	8.87
Total Applications	1.51	3.87	5.38
Total	8.75	5.50	14.25

System software accounted for about 60% of the market and its support element measured about 13% of the licence fee charges. Application software accounted for the remaining 40% of the market, while its support element measured about 12% of its licence fees. This lower figure is due to two factors:

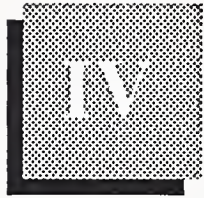
- System software is the maturer sector of the two and more installations have been penetrated with maintenance contracts
- Application products are sometimes supported with a separate professional services contract, which is therefore not included in the software products market figures

On the other hand, the trend is for application product support to be contracted at a higher price level than that for system products.



Support and Maintenance in the Midrange





Support and Maintenance in the Midrange

A

Definition of the Midrange

INPUT has chosen to focus on the midrange in this report, not only to show its software and support characteristics in isolation, but also because the increasing importance of the midrange has strategic implications for software systems as a whole in the 1990s. Important trends for the 1990s will be:

- Cooperative networked computing becoming commonplace
- Departmental office automation becoming an active ingredient in proactive corporate information systems
- The mainframe adopting the role of a server—whether for a database, a network or an application

For the purposes of this report, INPUT has adopted a definition of the midrange that excludes the desktop PC and consumer computer markets at the bottom end and the large, centralised mainframe market at the top end. Obviously, there are overlaps in performance and price:

- 386-based PCs offer supermicro performance and multiuser capability equal to the low-end midrange.
- Desktop engineering workstations have an enormous range of performance and prices, straddling the midrange as defined here.
- Older mainframe series such as IBM's 43xx come into contention with today's midrange offerings in terms of performance.

To simplify matters, INPUT has chosen to examine four subsectors with strong growth potential and what this potential means in terms of software provision and maintenance for the immediate and longer-term future:

- The IBM midrange, including AS/400 and the System 3X series that it replaces
- The Digital midrange VAX and VAX workstations area
- High-performance desktop and desktide workstations, often used for technical and engineering computer-intensive applications and, increasingly, run—as a result of Sun Microsystems' sector leadership—under the UNIX operating system
- The rest of the nonproprietary operating systems sectors including UNIX, PICK and MUMPS (excluding MS-DOS and the emerging OS/2 as essentially related to desktop single-user applications)

Exhibit IV-1 shows a tabular analysis of the midrange systems suppliers serving the 172 companies interviewed by INPUT. The top seven suppliers (by number of mentions) accounted for just under 80% of installation mentions with IBM taking over 40% as against Digital's 11%. This disparity, which does not reflect the market shares of the two companies over the whole minicomputer sector, is explained by the nature of the respondents whose applications were mainly in the commercial sector. Exhibit IV-2 shows the respondent breakdown between IS and general managers for each country.

Eleven percent of users dealt with more than one vendor, but only four users mentioned more than two vendors and in those cases the number of vendors mentioned was three. The breakdown of the multivendor situations is as follows:

- Three percent were using different mainframe and departmental minicomputer vendors
- Four percent used IBM or another vendor for their commercial data processing and Digital for technical or real-time applications
- One percent mentioned separate vendors for central, departmental and desktop applications
- The remaining 3% were genuinely quoting two or more competing midrange vendors

Multivendor situations were most common in West Germany (21% of vendors) with national suppliers such as Siemens and Nixdorf featuring in four out of the six cases. In other countries the range of percentages was from 7% to 13% with a mean of 8%. The degree of loyalty to a single vendor is high because of the complexity that results when users deal with more than one supplier. Thus, the multivendor software support requirement only occurs in a minority of cases.

EXHIBIT IV-1

Analysis of the User Sample Brand Ownership

	Number of Users by Vendor								Number of Users			
	IBM	Digital	Bull	Siemens	HP	Nixdorf	ICL	Philips	Other*	Single Vendor	Multi-Vendor	Total
West Germany	8	6	-	8	-	4	-	1	8	22	6	29
France	19	1	11	-	3	1	1	1	6	37	3	
United Kingdom	17	1	2	1	2	-	4	-	5	26	3	
Italy	8	2	-	-	1	-	-	-	5	13	2	
Scandinavia	8	5	1	1	-	1	-	2	3	15	2	
Rest of Europe†	23	7	1	1	2	2	2	1	8	40	3	
	83	22	15	11	8	8	7	5	35	153	19	
												172

*Unisys (5), Wang (5), Olivetti (4), DG (3), Datapoint, NCR, Prime, Tandem (3 each), +10 single mentions.

†Belgium, Netherlands, Spain and Switzerland contributed to the user sample.

EXHIBIT IV-2

Analysis of the User Sample by Respondent Type

Country	Percent of Respondents		
	IS Management	Other Management	Both Types
West Germany	10	6	16
France	13	10	23
United Kingdom	8	9	17
Italy	4	5	9
Scandinavia	7	3	10
Rest of Europe	11	14	25
All Europe	53	47	100

The multi-machine situation is very much more common. The frequency distribution of ownership of processors among the user sample was:

Percentage of Users

• One machine	42
• Two machines	25
• Three to ten machines	20
• From 11 to 50 machines	10
• More than 50 machines (up to a maximum of 500)	3
	<hr/>
	100

In a majority of midrange cases, the user is managing software support of some sort for more than one processor. However, of the 58% of users with more than one machine:

- Only 14% involved situations where vendors were supplying different ranges of equipment and half of these cases involved the simultaneous ownership of an IBM AS/400 and an earlier System 3X (either a 36 or a 38), i.e., they were in the middle of an upgrade situation.
- In just 7% of cases, therefore, the equipment supplier is likely to have to support system software on more than one range. In only one case was the supplier supporting three ranges. It must also be remembered that users were not asked about their PC or microcomputing support needs.

Exhibit IV-3 tabulates by country and vendor the number of machines supplied by each of the top eight firms already mentioned in Exhibit IV-1.

- Small machines push up the numbers in Italy
- The Scandinavian subsample is dominated by the 500 machines that one user had acquired from Nixdorf
- The U.K. users had noticeably fewer machines per user than the other major countries

B

IBM's AS/400 Series

1. Introduction

As well as using its regular contacts with IBM, INPUT interviewed 16 professional services and software companies that specialise in providing applications or system utility software to the IBM midrange community. This data enabled INPUT to obtain a rounded view of the challenges associated with software provision and maintenance in this sector.

AS/400 equipment consists of a seven-processor family with the model prefix B(xx), i.e., the B10 through B70 have been announced; the last was launched in early 1989 and was stated to be the first part of the company's initial launch promise to upgrade the range's performance by 100% each year for the foreseeable life-time of the product (the B70 is claimed to be 70% faster than the B60).

The B10 and B20 are floor-standing deskside units with a console table. The B30, and upward models are modular rack-mounted units designed to work under normal office conditions.

EXHIBIT IV-3

Analysis of the Density of Midrange Machines Owned by the User Sample

	Number of Machines by Vendor									All Vendors	Number of Machines Per User
	IBM	Digital	Bull	Siemens	HP	Nixdorf	ICL	Philips	Other*		
West Germany	85	8	-	57	-	4	-	13	10	177	3.6
France	53	1	58	-	4	15	1	1	10	143	
United Kingdom	25	5	8	2	4	-	6	-	16	66	
Italy	235	34	-	-	4	-	-	-	202	475	31.7
Scandinavia	15	15	12	3	-	500	-	41	9	595	35.0
Rest of Europe	117	23	12	1	13	4	5	15	70	260	6.0
All Europe	530	86	90	63	25	523	12	70	317	1,716	10.0
of Machines Per User	6.4	3.9	6	5.7	3	65.4	1.7	14	9		

*Unisys (5), Wang (5), Olivetti (4), DG (3), Datapoint, NCR, Prime, Tandem (3 each), +10 single mentions.

†Belgium, Netherlands, Spain and Switzerland contributed to the user sample.

The AS/400 system has been marketed with vigour by IBM as the long-awaited replacement for the System 3X range.

Many functions associated with individual pieces of software or optional facilities have been built into the AS/400 and its new proprietary operating system, OS/400:

- The integrated relational database
- A range of industry-standard communications protocols
- Implementation of SNA and SAA compatibility from the outset
- On-line help databases and on-line education/documentation
- Integral customer support assistance via a range of operating system routines that guide users, when a problem occurs, from self-help through linking to their IBM agent or IBM's customer service.

2. Software

With its new system, IBM has tried to include as much of the basic user needs as possible in the system software in order to maximise the system's simplicity and ease-of-use. The aim has been to avoid the jungle of software that for so long has characterised the data processing field, which is typified by the complex system software of the traditional 370 range, which needs support from the professional systems programmer.

Exhibit IV-4 illustrates the typical choice of software products facing an IBM midrange user. It is an analysis of the midrange software directory held by IBM in the U.K. in its National Solutions Centre database. The National Solutions Centre exists to collate the products available on the different IBM systems in order to make them more widely known to the user base.

Although this is not an exhaustive analysis, the table in the exhibit shows that in a major country market in Europe approximately 1,000 products are available. System software choices are relatively limited, with IBM offering only 15 product lines for the AS/400 (13 specific to it), while the independents currently offer even fewer. On the applications products side the choice is much wider. IBM, however, offers only a handful of products, some of which are major pieces of software, such as Office Vision/400 for office automation and MAAPICS for the manufacturing industry.

By mid-1989 the independents had converted one-third of their System/3X cross-industry products and almost one-half of their vertical industry

EXHIBIT IV-4

Analysis of the IBM National Solutions Centre Software Directory/Database

Type of Software	Number of Programs Described (1989)*					
	Supplied by IBM			Supplied by an Independent		
	AS/400 Only	AS/400 & System/3X	System/3X Only	AS/400 Only	AS/400 & System/3X	System/3X Only
Systems Software†	13	2	38	-	12	39
Applications Software						
- Cross Industry	6*	1*	19	-	102	210
- Industry Specific	3	3*	2	5	332	502
All Types	19	6	59	5	446	751

*IBM applications programs may consist of several modules, each of which is a separate program product.

†Systems software covers the operating systems, security routines, utilities and aids, languages, applications development and data management tools.

products to run on AS/400. Again only a handful of new products specific to the AS/400 had been completed and marketed within the AS/400's first year of life. Obviously all new products will be built to run in AS/400 native mode, and it is known that software companies are strenuously engaged in writing and rewriting applications for the new machine in key areas such as:

- Financial and distribution systems
- Local government
- Utilities
- Energy
- Manufacturing

Grossing up these activities over the whole of Europe, INPUT has estimated that between 500 and 600 software companies and agents are actively promoting more than 5,000 IBM midrange applications products (at an average of almost nine products or modules per company). In 1988, 25% of this market was for AS/400 projects; in 1989 this will have risen to almost 40%. The System/3X sector will continue to pull in both licence and support revenue because of its large installed base and because many users are continuing with their older-range equipment, while at the same time introducing AS/400s for new applications.

The strategic impact of the AS/400 on midrange systems and software and service vendors is profound:

- Traditionally IBM midrange systems have been implemented and installed by specialist companies that could offer a judicious mix of existing application products and customised or fully tailored software.
- Over the years these companies have built up a portfolio of existing kernel systems, which can be re-installed with partial or full implementation services.
- AS/400, with its powerful integrated set of system software, tools and languages, is attractive to the company with an in-house development team, especially one with RPG expertise.
- Shortened lead times on midrange hardware raises user expectations for fully-up-and-running systems from day one.

These trends are pushing the software and service vendors into becoming total system providers for small- and mid-size users that need to provide ongoing system support following the original commission and, in subsequent years, under the 'protection' of the IBM support umbrella.

3. Product Licences and Support

IBM has adopted its Graduated One-Time Charge (GOTC) as the primary vehicle for charging for its system and application software products, System Control Programs (SCPs) and Licenced Products (LPs) on the AS/400. The graduated charge means that the licence for the product is granted for use on the type of processor designated. There are seven grades of processor (or model groups) for the AS/400 family, one for each level of processor (i.e., separate ones for the model B10, B20, etc.) up to the model B70 announced in 1989. These groups are known as model groups D5, E5, etc. up to K5 for the B70.

Basic operating systems charges as a percentage of base configuration hardware costs range between 33% at the low end to below 9% at the top of the range.

This pricing method applies also to business software like AS/400 Office and Office Vision/400. (IBM's May 1989 announcement of SAA-compatible offerings for office automation included the OS/400 environment as well as the MVS, VM and OS/2 operating systems.) It also applies to full application software such as the MAAPICS and PRISM systems for discrete and process manufacturing, respectively.

This policy confirms the trend to adopting one-time and processor-linked software charges, first introduced with the 1986 announcement of the company's previous and less successful midrange offering, the 9370 series. Since INPUT's previous report on software support and pricing, *Software Product Pricing and Support Strategies in Europe, 1987-1993* in December 1987, IBM has extended the use of these pricing mechanisms to cover more and more of its processor types:

- S/370 family, running from 9370 up to the largest 3090s, now has seven processor model groups; Groups 10, 15, 18, 20, 30, 40 and 50
- System/88 fault-tolerant processors

In the 370 range, the one-time fee remains a charging option, although it is the most commonly used one for the low-end 9370 machines.

Monthly licence charges are now also offered on a graduated processor-linked basis (called the GMLC), rather than being linked to the operating system. This method is used for the top model group for large MVS systems.

In mid-1987 IBM removed its charges for central support of licenced programs and since that time ongoing maintenance charges have been in effect. Software upgrade charges have, however, been retained to cover the case where new licenced program products are released with new functionality. Two situations can occur:

- A version-to-version upgrade, in which the new release runs on the same processor or one in the same model group
- An equipment upgrade, in which the new release runs on another processor in another model group

Two new charging mechanisms for software and ongoing support were initiated by IBM in 1989:

- As part of its announcement of the original AS/400 range, IBM stated that it would produce an enhanced version of its MAAPICS application software—MAAPICS/DB—which would take advantage of the relational database manager built into the OS/400 operating system. Further announcement of the modules to be released in 1990 was accom-

panied by the introduction of an annual payment option under which the user pays in year one of a licence a combined charge consisting of a primary licence charge and an annual licence charge, and, in year two and subsequent years, only the annual licence charge. For example, a payroll module costs from \$1,850 to \$4,140 in year one and from \$250 to \$560 in each of the following years. Essentially, this mechanism is a variant of INPUT's most favoured charging mechanism as recommended in its 1987 report, *Software Product Pricing and Support Strategies in Europe, 1987-1993*. During 1987, INPUT's research found this practice in use only in a minority of cases. This is an experiment for IBM. It is being introduced in parallel with retention of the old monthly licence charge. (In the case quoted above, this would remain at \$360 regardless of processor module.)

- The second pricing innovation is related to the May 1989 European launch of the OfficeVision business software, designed to link all SAA modules in an enterprise-wide system to support basic office applications such as electronic mail, word processing, document transfer or search. In an enterprise-wide networked environment in which intelligence can reside centrally, departmentally and on the desktop, compatible business software is needed at the host/server locations and the connected workstations (known to OfficeVision as the work-place). This compatibility is achieved in OfficeVision by having complementary host and work-place modules for each host operating system environment supported:
 - MVS with OfficeVision/MVS
 - VM with OfficeVision/VM
 - OS/400 with OfficeVision/400
 - OS/2 LAN Office

In this way each of the SAA environments will offer OS/2, PC-DOS and nonprogrammable workstation options.

The OfficeVision work-place software and the server software are intimately related, because the functions are concurrently enabled in both work-place and server. Maintenance and programme updates need to be applied simultaneously and at the same level to both work-place and server.

The master copy of the work-place software is therefore supplied with the host OfficeVision product. The work-place code can then be distributed from the host server to each workstation. There is a one-time charge (OTC) for each copy of the work-place code distributed, which is the same regardless of which host server it comes from, and is \$850 for OS/2 and \$240 for a PC-DOS user. Authorisation to use software distributed in this way will be supported by a new agreement, the Distribution and Usage Agreement.

This agreement allows IBM customers to hold the master copy of the work-place software on the host server and distribute copies to each workstation, either on-line or via magnetic media.

The OfficeVision software for OS/2 and AS/400 systems will be offered for an OTC. GMLCs are being introduced for MVS and VM Office so that even on the smallest 370 processors, the 9370 and early 43XX series, a choice of one-time or regular software charging is available. Central software support will continue to be free of charge, but product upgrades will apply.

C

Digital VAX Superminis and Workstations

1. Introduction

Digital Equipment Corporation (Digital) is the second-most influential vendor in the computer market-place today. The company initially developed and grew by successfully selling minicomputers to scientists and engineers, but in recent years it has greatly expanded its commercial business. Digital's key advantages are the ease of networking among its own products and the ability to communicate with products made by other vendors, especially IBM. Coupled with a concentration on its main midrange VAX architecture (abandoning its earlier mainframe DECsystem range and de-emphasising its earlier, very successful 16-bit PDP-11s along the way), this ability to network has resulted in Digital taking the leading role in distributed data processing (DDP) worldwide—to the extent that DDP is now the accepted wisdom of the industry, a wisdom that even IBM has been forced to acknowledge and follow.

The recent trading difficulties experienced by many of its traditional rivals from the original minicomputer field (Data General and Prime from the U.S.; Nixdorf and Norsk Data from Europe) have led observers to speculate on the possibility of Digital running into trouble as the minicomputer is attacked:

- From the bottom by the multiuser microcomputer
- From the top by the increasing economies of scale of the mainframe
- Sideways from the high-performance workstation

However, these pressures are not eliminating the middle-ground of computing. Rather, the flexibility and modularity visualised in the distributed processing concept require a matching flexibility in solution implementation while also opening up a range of solution possibilities.

Nevertheless, Digital is going through a period of difficulty as users await the resolution of some of the questions relating to the company's strategic directions. These refer mostly to the operating system strategy:

- Proprietary (VMS) or nonproprietary (UNIX = ULTRIX)
- VMS functionality versus the cheapness of the UNIX commodity approach
- The question of open systems cohabiting effectively with closed systems on a single-vendor platform

The extent of the software, both system and application, which is now offered to the Digital user base means that there is no simple answer that can be implemented quickly. Digital's success in growing to a company with revenues of \$12 billion has expanded its user base into the boardrooms of the world during the last decade. In many ways, the company has not yet caught up with the consequences of this success:

- On-line teleprocessing (OLTP) software from Digital has only come on-stream in the last two years.
- Database managers and CASE tools from third-party vendors are running over Digital's own products.
- Software product licencing and support pricing at Digital have now become almost as labyrinthine and confusing as at IBM.

2. Software Licensing

Digital has a basic policy for software licencing:

- Software is unbundled.
- Software support is extra to the licence fee.
- Software upgrades are chargeable.

In arriving at its software fees, Digital employs a number of mechanisms:

- Fees are graduated according to the processor on which the software is run.
- Fees are banded according to the number of users attached to a system, and these bands will have different widths according to the processor on which the module is run. Breakpoints in price at 4, 8, 16, 20 or 40 users all occur in different combinations on different models of processor. On some models the licence for the lowest band usage is bundled with the basic hardware configuration.
- On some smaller systems the user can opt for charging by number of users or by processor size.

- Discounts by number of systems are sometimes granted. They range between 20% and 45% depending on volume.

Software upgrades are chargeable in two parts:

- The first part upgrades the licence or 'right to use' the software.
- The second part provides the new software as a kit, containing the software on a medium (cartridge or disk) and its documentation, usually in printed form but now also available on CD-ROM (VMS 5.1 for VAX stations can be acquired on a CD-ROM that contains software and the documentation).

Most of these mechanisms are subject to modification or suspension by individual negotiation or in association with specific package deals for migration, conversion or seasonal offers.

Replicated software—for more than one processor (in a cluster, on a site or for a single account)—will be subject to other constraints as follows:

- VAX clusters have their own licencing arrangements—the Digital Clusterwide Software licence.
- Client/server configurations on an Ethernet or other LAN can attract a central server fee plus 'n' x the client licence fee for 'n' users.
- There may be a 'right-to-copy' licence granted to the user, who is then responsible for replication from his or her first kit, or, alternatively, he or she may only need to acquire as many media/documentation kits as needed.

3. Software Support and Pricing

In April 1988 Digital announced that it had decided to rebundle hardware maintenance and software support as from October that year. This decision resulted in conflict with some of the largest Digital users in Europe, which lasted well into 1989. To understand the cause of the problems and the emotions aroused, it is necessary to understand the structure of the earlier support services that the company announced it was changing:

- Before the changes, users could choose separate maintenance policies for hardware and software. New systems were covered, at no cost, for a full year from the date of purchase. Once the year had expired, the hardware maintenance options were DECsystem Support (a contractual service that was exactly the same as warranty) or Basicsystem Support (a lower-cost contractual service than DECsystem Support but with longer response time).

- The customer's choice of options for software maintenance included layered products and the VMS and DECnet operating software. The first was to take out the DECsystem Support or Basic Support contract, depending on the response required, which covered support, maintenance and upgrades. The alternative, for customers that only wanted to buy software upgrades, was the Self Maintenance Services (SMS) whereby for a fixed fee new releases of the software were sent by DEC to the customer site. This option was most favoured by users of third-party maintenance services.
- The final option was not to take out a contract and buy software on an ad hoc basis, which could prove expensive.

But under the new policy, customers that do not use Digital for both hardware and software maintenance now have no choice but to buy all of their software on an ad hoc basis by purchasing an update licence as and when new releases become available. However, users that keep all their software up-to-date but do not use Digital for hardware maintenance are heavily penalised.

Now that the situation with the users has stabilised, Digital claims that, owing to this rebundling of software support with the hardware maintenance, 96% of users are better off and software support as a revenue stream has dropped by 20%.

In contrast, however, the company is decreasing product life-times in order to offer considerably more performance for relatively low cost increases, thus adding to its hardware revenue stream.

Exhibit IV-5 shows the analysis of the worldwide software source catalogue for Digital's VAX range. More than 4,000 products are being supported in a growing revenue stream. Comparing and contrasting it with Exhibit IV-4, which showed the IBM midrange equivalent position, we can note the following differences and similarities:

- The IBM catalogue included a majority of programs that are only available in one major European country market. Grossing up from this case to the whole of Europe would entail an analysis of a similar number of products to those in Digital's catalogue.
- IBM's catalogue shows a majority of products in the industry-specific applications sector, while the majority of Digital's products are in the cross-industry sector. In its midrange, IBM is concentrating on commercial applications in which the greater the specificity of the product, the greater the potential competitive advantage or value added (see Chapter III for the discussion on 'generic' and 'germane' software). Digital, on the other hand, also serves its technical and scientific user base with a range of cross-industry engineering and research applications.

EXHIBIT IV-5

Analysis of Digital's Software Catalogue for the VAX

Type of Software	Number of Programs Catalogued (1988)			
	Supplied by		Number of Independents	Total Number of Programs
	Digital	Independent		
Systems Software*	245	879	216	1,124
Applications Software				
- Cross-Industry	64	1,610	946	1,674
- Industry-Specific	40	1,312	456	1,352
All Types	349	3,801	1,162	4,150

*Systems software covers the operating systems, security routines, utilities and aids, languages, application development and data management tools.

- Both catalogues show that the manufacturers' involvement in applications programs, as evidenced by numbers of products, is slight. However, the systems that are marketed include jointly sold products under various cooperative marketing schemes. Like the hardware suppliers' office automation products (OfficeVision, All-in-One) these are important revenue earners:
 - Industry products such as MAAPICS are significant in price terms although sites are selective.
 - Business software has a one-to-one potential with the whole user base and potentially a very high multiplier.
- IBM markets many of the same kind of cross-industry products as Digital does, but its products are on other equipment ranges, e.g., 6150 workstations or 4300 series and upwards (on the System/370 catalogue).

D**High-Performance Workstations and the UNIX World****1. Introduction**

The high-performance workstation has been one of the principal driving forces in the information services market of the 1980s. It has its origins in the start up of the Apollo Computer company in 1980, which introduced its Domain workstations to technical professionals at the same time that the personal computer (PC) was starting to revolutionise computing practices for the average office worker. In both cases the aim was the same, to free the individual from the constraints imposed by having to use shared facilities.

The high-performance workstation has increased as a market sector from nothing in 1980 to more than \$4 billion in sales worldwide in 1988. Its success is due to one reason. The workstation was designed to act equally well as a stand-alone station or as a node in a cooperative network of processors where the minimum power available on each desktop could be supplemented by shared resources of extra disk files, printers, terminals or other networks.

The flexibility of this approach led the workstation to encroach on the traditional preserves of the mini- and superminicomputers in areas such as:

- CAD/CAM
- Laboratory and research applications
- Commercial applications, especially in the financial sector

By the time Apollo, the pioneer, was overtaken in size by its younger and more aggressive rival, Sun Microsystems, two significant thresholds had been passed, one commercial and one technical:

- First, the workstation sector had proven that the right price per desk-top delivered MIPS (millions of instructions per second) could be provided better from a series of personal workstations than from the traditional multiuser, multiprogramming minicomputer (with its costly, complex overheads notoriously hard to predict in fresh application situations).
- Second, Sun's espousal of the standard UNIX open operating system (at the time, already well-known to the technical and research computing community) aided its phenomenally fast growth by allowing it to offer future expansion capability, in contrast to the cradle-to-grave approach of the industry giants with their locked-in proprietary environments.

Sun's desire to outgrow Digital and become the new wonder child of the industry has not yet been achieved. Sun, with more than \$1 billion in

annual revenues in fiscal 1988, is still at an order of magnitude less than Digital, with more than \$12 billion in worldwide revenues in fiscal 1988. But Sun has had an influence beyond its numeric strength because it has been delivering what the users have wanted: ever cheaper, ever more powerful computing power in a convenient form that is easy to use and can be integrated into a user's earlier hardware and software investments.

Sun has promoted UNIX to a stage where it is regarded as the prime open architecture operating environment for general-purpose computing worldwide, but Sun has not been solely responsible for this perception. A number of factors have been working within the industry during the past decade—so much so that 1988 became the watershed year when UNIX achieved a level of notoriety from which it can never easily fall back again into unrecognised academic obscurity. These factors were:

- The open systems concept, born of the need for easy networking, continually foundered within proprietary operating systems.
- Software portability has become more essential.
- The convergence of telecommunications and data processing has led national governments and new market entrants alike to promote open systems in opposition to the stranglehold of the multinational equipment suppliers.
- The advanced facilities that have increasingly been built into UNIX, through its use in demanding high-performance applications, have finally overcome the initially well-founded reservations of the commercial data processing users.

In 1988 the split in the UNIX community between the Open Software Foundation (OSF) with vendors like IBM, Digital and Hewlett-Packard in its ranks, and UNIX International, led by AT&T, the owner of the UNIX software, was triggered by the supposedly favoured treatment being proposed by AT&T for its new joint venture partner, the up-start Sun. Whatever the rights and wrongs of the arguments from both sides, MIS managers realised:

- In 1988, UNIX-based systems accounted for between 12% and 20% of all midrange and mid- to large-size computer systems sold in Western European markets (the actual percentage depends on the country market concerned).
- Vendors dedicated to UNIX-based systems are expanding currently at rates of 100% per annum.
- The UNIX market for products and services is expanding at between 30% and 40% per annum.

2. Impact on Software and Software Support

The de facto adoption of UNIX as the prime operating system standard for open systems and the concentration of its involvement in the midrange of systems by size is having a strategic impact on the whole information systems industry via its impact on software provision. All other trends created by the expected further penetration of the UNIX open system solution stem from the fact that open systems allow for software from all sources to become ported onto potentially any hardware platform.

Stemming from this increase in the potential for portability are the following strategic trends:

- Software products will be the most important delivery mechanism for applications.
- Equipment suppliers will be able to point to the increasing number of packaged portable applications that have been fully tested in the open systems market running on different platforms.
- Professional services will remain an important vehicle for delivering the total solution, consisting of the equipment, software and services mix.
- A third-party software support market will grow up to offer facilities in solutions maintenance across open architecture installations.

Exhibit IV-6 illustrates the polarisation of the market, which currently is most evident in the midrange between the two proprietary giants and the nonproprietary UNIX team:

- Digital has formed a strategic alliance with Apple and remains committed to its proprietary VMS environment, although with a leading share in the technical workstation sector and strong investments in its ULTRIX UNIX system, it can offer the advantages of both approaches.
- IBM remains at the summit and promotes SAA as its strategic envelope across incompatible proprietary architectures. Its AIX version of UNIX is strongly promoted only to specific technical applications.
- The rest of the vendors are inevitably drawn to the shelter of the UNIX corner, where critical mass has now been reached and is influencing both IBM's and Digital's strategies.

EXHIBIT IV-6

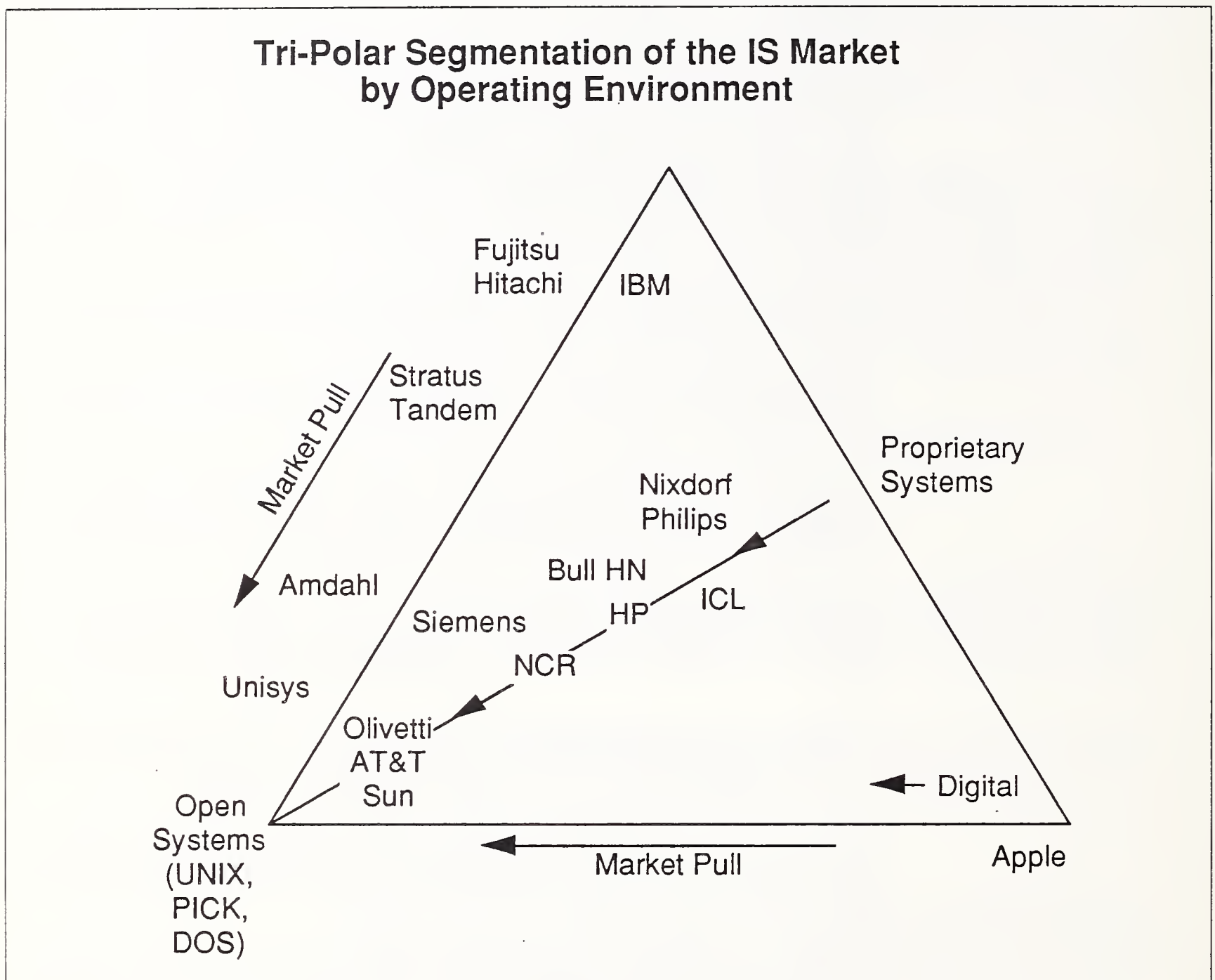


Exhibit IV-7 shows an analysis of a typical software catalogue for UNIX products as offered by one of the major equipment suppliers. Along with the majority of vendors, this manufacturer currently provides solutions both on its own proprietary ranges and on midrange systems under UNIX. The catalogue still only includes hundreds of products, whereas around 1,000 are estimated by INPUT to be available in each major country in Europe. The category with most products is the cross-industry applications sector. The industry-specific sector has the least number of products but is expected to grow more rapidly than the other two.

EXHIBIT IV-7

Analysis of the UNIX Software Catalogue of a Major Equipment Vendor

Type of Software	Number of Programs Described (1989)*			
	Supplied by		Number of Independents	Total Number of Programs
	Equipment Vendor	Independent		
Systems Software†	42	36	26	78
Applications Software				
- Cross Industry	8	192	43	200
- Industry Specific	-	71	32	71
All Types	50	299	75	349

*A program may consist of a suite of several modules.

†Systems software covers the operating systems, security routines, utilities and aids, languages, applications development and data management tools.

E

Other Nonproprietary Operating Systems

Two other operating systems have been laying claim to open systems status over the years:

- PICK was developed by Richard Pick as a multiuser machine-independent operating system originally for on-line military stores systems.
- MUMPS was developed out of a system at Massachusetts General Hospital and has facilities particularly useful in that type of computing environment.

Although both systems have strong followings, neither has been adopted as a universal system in the way UNIX has:

- PICK has concentrated on multiuser departmental applications without heavy communications requirements.

- MUMPS has specialised in ease of programming in the complex medical systems field.

Nevertheless, both will continue to be used and will form part of the cohabitation environment of future open systems in which compatibility will be obtained by host/guest arrangements between different operating systems supported across networked systems.

Exhibit IV-8 summarises the 1988 European market for midrange software. The table is a breakdown across the major operating system environments. Overall, software support and maintenance forms about 14% of the total market and 16% of the product licence component.

EXHIBIT IV-8

Midrange Software Product Licence and Software Maintenance Markets by Operating Environment

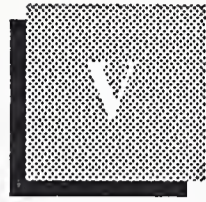
Software Product Segment	Western European End-User Expenditures 1988 (US\$ Billions)				
	Proprietary			Non- proprietary†	All Operating Systems
	IBM	Digital	Other		
Licences					
Systems Software	0.42	0.48	0.55	0.37	1.82
Applications Software	0.31	0.45	0.26	0.35	1.37
All Software	0.73	0.93	0.81	0.72	3.19
Maintenance & Support					
Systems Software	0.08	0.07	0.07	0.06	0.28
Applications Software	0.05	0.08	0.04	0.05	0.22
All Software	0.13	0.15	0.11	0.11	0.50
Total					
Systems Software	0.50	0.55	0.62	0.43	2.10
Applications Software	0.36	0.53	0.30	0.40	1.59
Total	0.86	1.08	0.92	0.83	3.69

†e.g., UNIX



Software Pricing and Issues in the Midrange





Software Pricing and Issues in the Midrange

A

Introduction

The objective of this chapter is to describe the current status of pricing methods and support practices in the software sector from both the user and the vendor points of views. The emphasis is on the influential midrange of the market, whose trends are driving the future of the industry.

Traditionally, software has been less uniform in its pricing practices than equipment, which is usually offered under one of three methods:

- Purchase
- Rental
- Leasing

The principal pricing methods for software are associated with the issuing of licences to use the software. A system has evolved whereby the ownership of the software is not transferred to the user, but is held in perpetuity by the producer or supplier of the software product. Thus, the intellectual property rights in the software remain with the supplier or its principals.

Therefore, the existing methods of supplying software, amount to a type of rental, i.e., a rental of the right to use the software in given circumstances and over an agreed period of time. Software has replaced equipment as the industry's main rental-based revenue stream. In doing so it has, however, become much more complex, as a legal and commercial entity, than the equipment rental stream ever was.

Different types of licences are used by vendors. This survey examined the extent to which users and vendors see the different types currently being used in the market-place. Various durations of contracts and various payment terms can be involved. These aspects, when taken together,

are summarised under the term, the charging mechanism. How this mechanism varies in practice and how it has evolved since INPUT's 1987 report, *Software Product Pricing and Support Strategies in Europe, 1987-1993*, are analysed in this chapter, with particular reference to the midrange hardware platform and the support function.

The emphasis in this report is on the commercial aspects of supporting licenced software that is available on the open market. The legal aspects of licencing are not discussed in detail. Therefore, in the report the words 'bought' and 'sold' may be used to cover the acquisition of licences on some basis or other, irrespective of whether these terms are used correctly in the strict legal sense.

B

Current Vendor Charging Mechanisms

When analysing the total charging mechanism, it is necessary to distinguish between two important aspects:

- Charging methods
- The tariff structure, which determines the final figures that users with particular system configurations from different suppliers will be charged, and includes any standard discounting

1. Charging Methods

Two licencing periods are found in the market-place:

- Short-term licences, typically for anything between two and five years. This type of licence gives the right to use the software only over the agreed licence period. This method is more commonly used for system software where changes to the machine environment may occur rapidly and both user and vendor will want to review the situation at short intervals. Such licences are often charged for on an annual basis. The annual fee may also cover support and maintenance of the product(s).
- The second most common type of licence is for permanent use and may be called a perpetual licence. It is most frequently charged for by an initial fee levied when the licence is issued, with maintenance and support of the product(s) (within the ensuing period in which the user wishes to renew his or her licence thereafter) being purchased either optionally or in some cases on a mandatory basis.

Warranty on products is more contentious for software than for equipment. In practice it often amounts to setting a time when the period for chargeable maintenance will start. In the case of those products where an annual fee includes support and maintenance, the subject of warranty is largely academic except that different levels of maintenance can attract different service levels during the warranty period. This is a complexity that is becoming more common as vendors vie with each other on service differentiators.

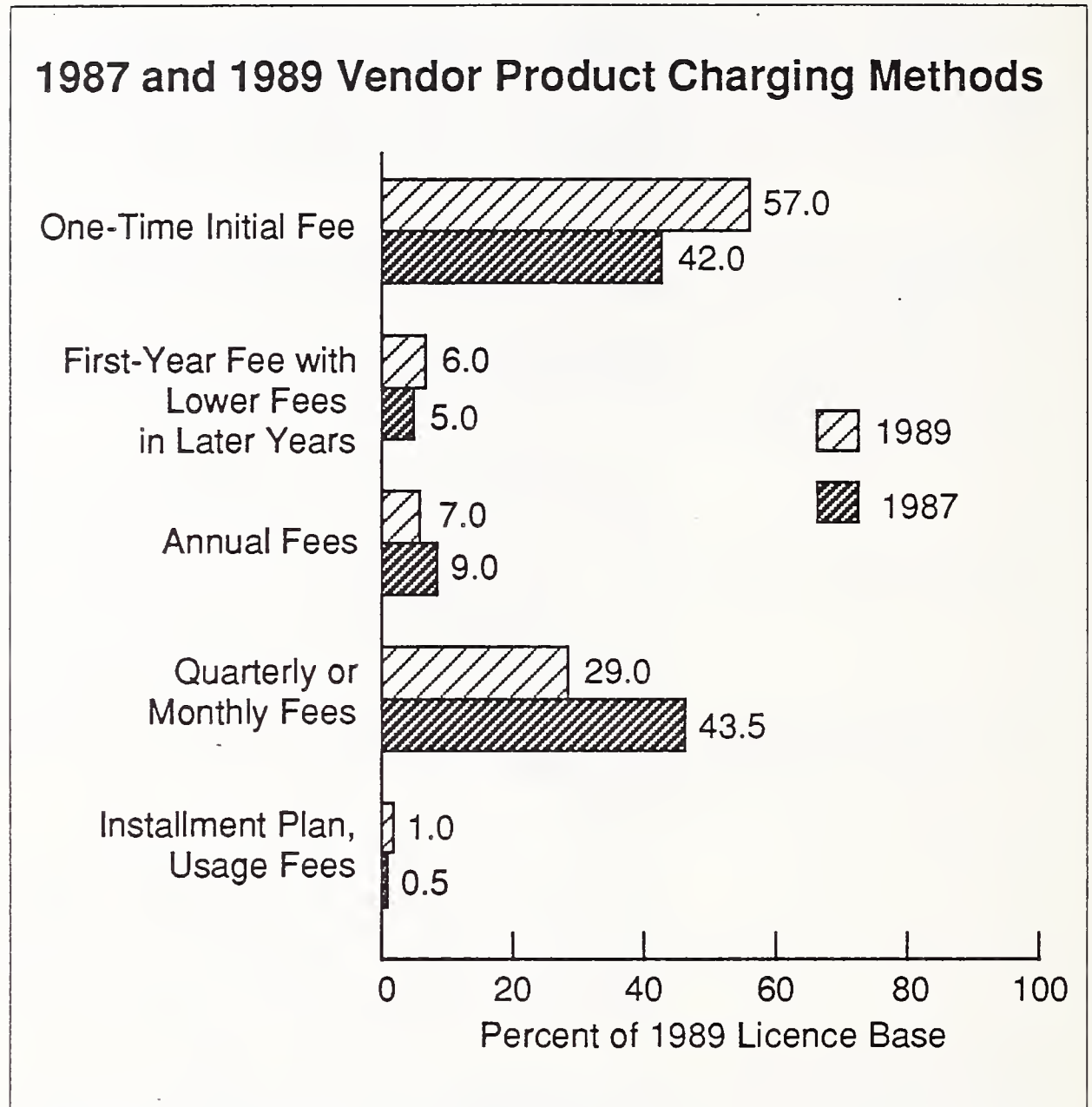
Currently, a number of different charging methods are used:

- Regular licence fees may be chargeable annually, quarterly or monthly during the period of licence validity.
- The initial fee, often called a one-time fee, acquires the right to use the product over the agreed licence period.
- The installment plan allows the one-time fee to be spread over a number of years.
- The use of an initial charge during the first year of use acquires a licence only for the first year, but annual charges at a lower rate are then levied in the second and subsequent years.
- The leasing arrangement, whereby the user pays regular annual, quarterly or monthly fees to some third party (i.e., if the software is acquired as part of a complete turnkey system deal, through an equipment leasing company or, in general leasing, through a financial services company).
- In those cases where one or more software products form the basis of a system developed by a professional services vendor or supplied as part of a turnkey project, the charge for a software product may be buried in a total project price. A variant of this case has the money being paid for the licence by some form of stage payments for the overall project.
- Usage pricing is a method whereby the charge for a product is calculated according to the amount of metered use made of that product by the user. This method usually falls into one of two categories:
 - Machine-resource usage, i.e., usage is calculated according to some algorithm, operating with pre-defined resource elements
 - End-user usage, i.e., this may take the form of a price calculated by the number of terminals or keyboards connected to the machine running the software

Exhibits V-1 and V-2 show the breakdown of the European market according to the main charging mechanisms, found in current use. Exhibit V-1 shows how the charging methods reported by vendors across the whole European market have altered since 1987. Clearly the two major methods are:

- A one-time initial fee was used in almost 60% of cases in 1989.
- The regular licence fee (levied on an monthly, quarterly or annual basis) accounted for 36% of cases in 1989.

EXHIBIT V-1

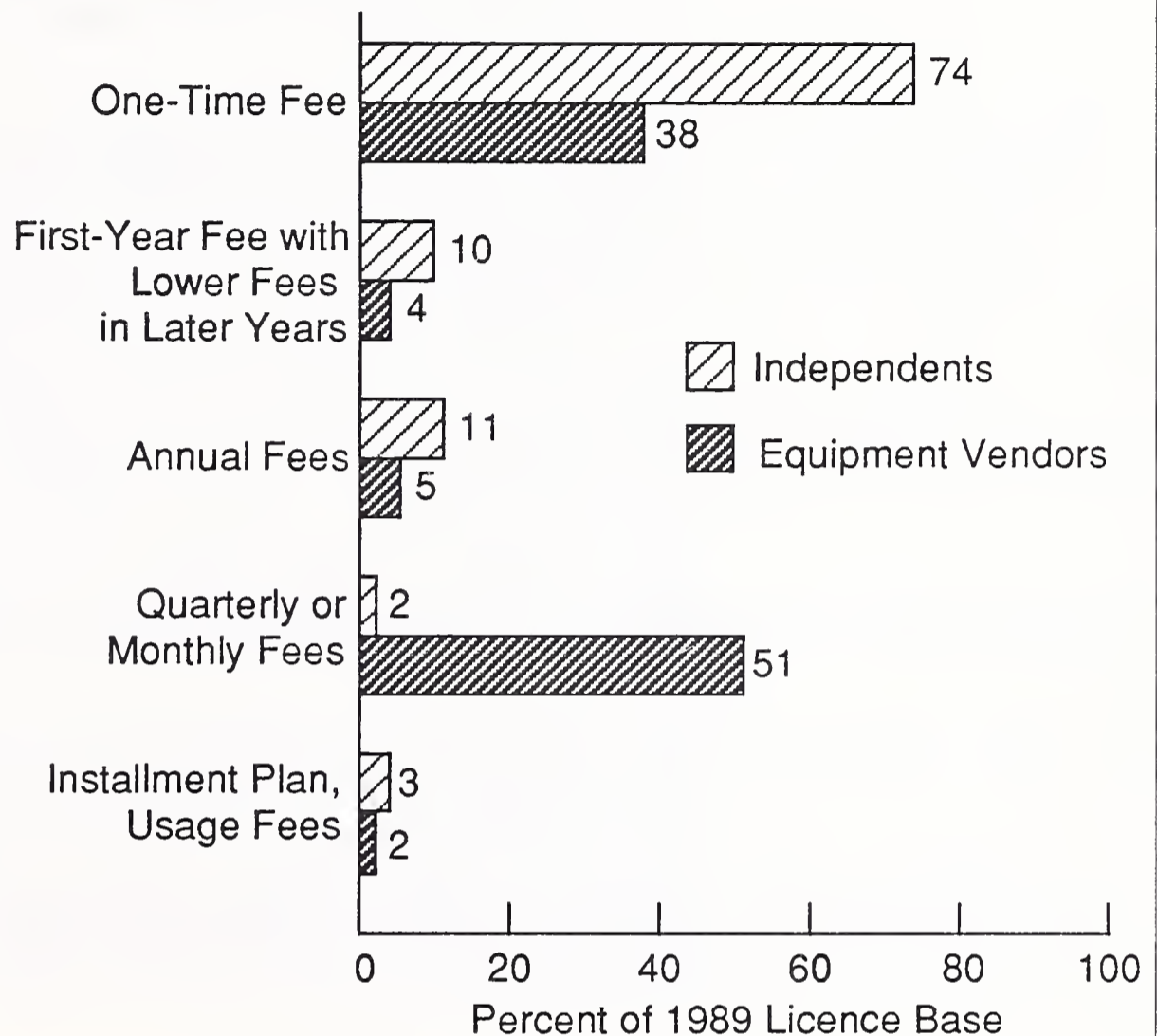


The one-time initial fee is more favoured than any other method for applications software, although monthly and quarterly fees are charged for 40% of system software cases.

The breakdown showing differences reported by equipment vendors and independent software suppliers is given in Exhibit V-2. It shows a similar distinction between the independents preferring the one-time fee method, while the equipment vendors retain a strong, though falling, bias towards quarterly or monthly fees. Until 1986, the quarterly fees method was IBM's principal charging method.

EXHIBIT V-2

Vendor Product Charging Methods Equipment Vendors versus Independent Suppliers



2. Price List Structure

The structure of the vendors' tariff has three aspects:

- In the case of the independents, tariffs are structured according to the equipment upon which the products are made available. These are typically limited to between three and six ranges of equipment. For example, a vendor might offer systems on IBM mainframes, Digital VAX equipment and other minicomputers, i.e., from Hewlett-Packard, Prime or Data General.
- Tariffs are also structured by numbers of end users—either precise numbers of users or within certain bands. This categorisation is normally done by stating the maximum number of workstations or terminals that may be attached concurrently to a system. Variants of this method have been adopted by Digital for many of its minicomputer, workstation and clustered systems.

- Finally, a tariff may be structured by machine or processor group, sometimes called graduated pricing. Machines are grouped according to their processor ratings as a rough way of measuring the number of end users who may be benefiting from use of the software. The larger the processor group, the larger the potential number of users that can be connected.

The last two methods represent simplified forms of usage pricing. They can be, and are, used in combination. Graduated pricing is an alternative to operating systems-specific pricing. In the future, different versions of a product for different operating environments will continue to be sold (e.g., a XENIX version and a UNIX version), but in the open systems market, versions for different vendors' ranges will become less differentiable and so the independents can be expected to adopt forms of graduated pricing as well as the manufacturers.

The major milestone in a general market move towards use of graduated pricing was IBM's October 1986 launch of the 9370 range of distributed processors. Since that time the market as a whole has been falling into line with what IBM has proposed for its own series.

At the same time as the introduction of the graduated machine group charging, IBM stated that the option to purchase on a one-time fee basis would be introduced progressively up the range of machine groups in the tariff. Thus, one-time charging would be an alternative user option, available immediately with the 9370s and would proceed through the 4300 and larger systems—the old DOS/VSE and MVS environments—progressively.

To an extent this was IBM following in software terms what it initiated in 1979 for equipment with the debut of the 4300. INPUT recommends moving away from a regular rental base charging system and towards a system of outright purchase. There are now 15 different processor groups; on 12 of these a one-time fee option applies.

Vendors still have little inclination to adopt innovative pricing mechanisms. The industry is cautious and procedures seem to be set up that allow for a follow-the-leader approach, rather than for trying anything revolutionary. The major trends mentioned by vendors were:

- Open pricing in their direct supply catalogues (now accounting for anything between 10% and 25% of revenues for the equipment suppliers)
- The move to value pricing from cost plus for support as well as product

- Flexibility of approach (e.g., the software producer supplies the development system, while its distributor supplies the corresponding run-time systems)
- Pricing for networked products

The artificial intelligence (AI) sector introduced the practice of selling development and run-time systems separately. Run-time systems are usually sold separately to a user in multiples of, say, 10 after an initial development system had been sold in ones or twos. This trend has significance for the longer-term pricing of software products, as it introduces a new method of layering tariffs.

The practice has now been extended into the database management systems (DBMS) and 4GL areas, where it offers considerable discounting flexibility in multisite and multiprocessor situations.

C

Discounting

Discounts are a standard feature of software product pricing. It is important to distinguish two different types of discount:

- Standard discounts from list price, i.e., discounts applying to all customers fulfilling certain criteria
- Individually negotiated deals, where the percentage discount for licenced systems will depend upon the parameters of the user in question. These are often very large users that are going to purchase a number of important products over a period of time.

A number of different discounting methods are in current use in the software market-place:

- For products run on separate sites, with sites defined as physically separate locations of the same organisation
- For products to be run on more than one processor irrespective of siting
- For additional modules—these are normally applied when a total application system may be configured from a range of modules, some of which may be mandatory
- By total volume of fees spent with the supplier over the course of a period, normally over one year
- Granting a discount on additional products is akin to the method of using volume fees, but in this case the discount is identified against a total number of products picked from a catalogue

- Traditionally, educational users have been able to establish good discounting concessions from software suppliers and this continues to be so, although from time to time disputes break out when vendors attempt to rationalise their tariff structures

Other methods of discounting encountered include:

- By number of staff employed, a method often used by payroll product suppliers, in which a number of different price graduations can be set for different numbers of staff on the payroll
- Special tariffs for distributors

Additional site and processor discounts may involve the copying of software modules by the user, although it is more common for multiple copies to be produced on the software supplier's premises and issued as separate units on a standard medium, such as magnetic tape, cartridge or diskette.

Only a small percent of the vendor sample claimed to offer no form of standard discount whatsoever. Even in these cases, some form of individual concession could be negotiable for large users or important contracts.

Although the most popular method of discounting is for the user of additional processors, the method using additional sites is also strongly favoured. The former method gets over the difficulty of where the processors are sited and how closely coupled they may be.

The highest range of concessions is still for the educational market. There is a loss leader element in vendor policies here; the benefit is getting a new generation of computing professionals acquainted with the vendor's name and equipment.

Vendors take a varied approach to solving discounting problems. In many cases the vendor feels that he or she may have to give a discount in some form or other but prefers to make the concession appear to be part of a standard list price. This confused picture reflects the competitiveness of individual software sectors, as well as the squeeze that software budgets traditionally feel as a result of hardware taking the first and more visible slice of a user's expenditures.

INPUT believes that correct management of the support and maintenance function also will enable suppliers to feel more comfortable in discount pricing policy.

D**Support Pricing**

Software support and maintenance pricing is handled by a number of different charging methods:

- A user may opt to take out no support contract, confident either in the software or in its own abilities as an organisation to support it should problems arise.
- If a licence has been granted on payment of a one-time fee, the user may opt for a regular (usually annual) fee, which is calculated as a percentage of the initial product charged. It is normal for this percentage fee to be calculated on the basis of the current one-time licence fee list price. This gives the vendor the ability to increase support prices as support labour costs go up.
- A regular support fee may be raised in those cases where a regular product licence fee is in force. Again, this may be either monthly, quarterly or annual to fit in with the charging mechanism for the licence. In many cases it would be considered by the user on the basis of being a percentage levy over the corresponding licence fee.
- A trend for free support facilities (i.e., bundled into the licence fee) is occurring. This normally takes place when a regular fee is being charged. When bundled into a one-time original fee it amounts to a life-time warranty on the product. This method is sometimes used for short-term licences, for example, four years.
- A new method, first used in 1988 by Digital in Europe, is bundling software support into the equipment maintenance to offer a total system maintenance fee. When Digital first launched its new services portfolio with this mechanism, users strongly resisted. In 1989, Unisys introduced its a la carte method along similar lines, (one motivation was to speed up the rationalisation of disparate charging methods, inherited from the Burroughs and Sperry units).
- A fixed annual fee, which is calculated as a function of each product, may be charged. In the case of one major vendor this is calculated on a cost plus basis, cost plus being evaluated each year according to the experience of previous years. This method is being used increasingly by vendors that are trying to move away from support pricing being tied to the product licence fee on some sort of percentage basis. Users, however, cannot easily separate the support fee from the licence fee in their minds and usually link it to some arbitrary percentage calculation.
- A fixed fee may be raised for support irrespective of the original price of the product and across all products in a catalogue. Such a fee is normally charged on an annual basis. This mechanism is found at the lower end of the market in the support of certain microcomputer prod-

ucts. Here it is being used for the sake of simplicity in a sector where the overhead associated with calculating an individual price would not be worth incurring.

- Support may be charged at a daily rate, i.e., on a time and materials basis. Obviously, those users who opt for no contract will have to use this method if a true emergency occurs.

Midrange users prefer to maintain their own application software. Presumably this is because the majority of their applications systems are built in-house. Exhibit V-3 gives the breakdown of the user sample's use of the different sources of maintenance for application software (ranked in descending order of importance). A rating of 5 was given to sources considered "most important", 4 for the second-most important, and so on down to 1 for the least important. Unmentioned sources did not score at all; where two or more sources were rated of equal importance, the available points were shared equally between them. The aggregate country scores were standardised so as in each case to total 5.0 (by dividing by the total points awarded in each country and then pro-rating to 5). This allows for valid intercountry comparisons to be made:

- Only in France is the in-house method dislodged from first place (in this case it takes second place to the equipment suppliers).
- The equipment suppliers are the second-most important source in West Germany and hold this place in the all Europe ranking.
- The U.K. and Rest of Europe place the use of professional services vendors second after the in-house source. These vendors are in a position to maintain software produced by any of the other sources.
- Software product suppliers are in second place in two cases, Italy and Scandinavia. The trend to use more application products in the midrange is expected to make the product vendors more important as maintainers.

Comments from users included the following:

- 'Most application software is maintained in-house; the only exception is for our CAD products supported by the software vendor.'
- 'Siemens supplies our software product for the personnel department.'
- 'We have our own task force for maintenance. Their activity is integrated with the development and implementation teams.'
- 'We are fully satisfied with our own support.'

EXHIBIT V-3

User Sources of Applications Software Maintenance

Source	Points Rating in Each Country Market*						All Europe
	West Germany	France	United Kingdom	Italy	Scandinavia	Rest of Europe	
In-House	2.2	1.7	2.0	2.6	2.2	1.9	2.2
Equipment Supplier	1.7	2.4	1.0	0.3	0.8	0.9	1.2
Software Product Supplier	1.0	0.2	0.4	1.7	1.8	0.8	0.8
Professional Services Vendor	-	0.7	1.3	0.4	-	1.2	0.8
VAR/OEM	-	-	0.3	-	-	0.2	0.1
Other†	0.1	-	-	-	0.2	-	-

*Scale of 1 to 5, where 1 is the lowest rating and 5 the highest. All scores standardised to total 5.0 by dividing by the total points awarded in each country and then pro-rating to 5.0. Average standard error 0.07

†Independent consultant

- 'We only use the consulting visits element of our software vendor's service.'
- 'We use Digital for hardware and software support.'

Exhibit V-4 shows the breakdown by charging method for the sample of midrange users interviewed. The installed base of products at the end of 1988 was used as the basis of the calculation. This method is necessary because certain of the options (for example, not having a contract or bundling the support into a regular fee) involve no user expenditure and therefore using a percentage of user expenditure would give a distorted picture.

EXHIBIT V-4

User-Reported Percent of Products Charged For Using Different Support Charging Methods

Charging Method	Percent of Products in Each Country Market						All Europe
	West Germany	France	United Kingdom	Italy	Scandinavia	Rest of Europe	
Not on a Contract	39	0	20	1	20	9	12
Percentage of a One-Time Fee	4	4	20	38	-	15	14
Percentage of a Regular Fee	46	75	13	15	70	22	39
Fixed Fee per Product	4	11	10	39	-	18	14
Fixed Fee Irrespective of Product	-	7	5	-	-	20	8
Bundled into Licence Fee	-	-	-	-	9	6	2
Other (e.g., Internal Transfers, T&M, Retainer, Fixed Response Time Agreement)	7	3	32	7	1	10	11
	100	100	100	100	100	100	100

One hundred and twenty of the 172 respondents contributed to this analysis. Of these, 15% claimed to have some products that were not maintained, while 8% experienced more than one charging method.

The table shows the equivalent position for each country market researched. The comparison between the 1989 and 1987 positions and the details of the percentage rates for maintenance contracts are discussed in the next chapter.

For purposes of simplifying their offerings, some independent vendors have favoured bundling support into regular fees. Certain of the equipment suppliers have now followed suit, notably IBM and NCR.

For application software the equipment vendors also gain a significant contribution from other types of pricing in which the fixed fee per product is the most favoured method. For the larger users individual negotiations according to the size of the installed base of equipment in their organisations is a common method involving the volume discount principle.

In summary, it is important to remember that a user may receive four types of charge from its equipment vendor for a computing system:

- Equipment costs
- Equipment maintenance and support costs
- Software licence fees
- Software support fees

Because software support fees arise last among computing system charges, there is a tendency to find that a budget has run out by the time the software support charges are being considered. For this reason they tend to attract the most displeasure from the user community. The situation is potentially a messy one in which vendors should consider the clarity of their overall image and marketing stance.

Vendors must ensure that they do not incur the displeasure of users when faulty software needs to be debugged during the course of a support contract. For example, the user may think the product is being debugged for a fee, when this service should be included free of charge if the product claims to be a useable item.

E

User Satisfaction with Application Support

Exhibit V-5 contains two analyses of user satisfaction ratings, the first a breakdown by country, the second by maintenance source. The tables show the averages of the respondent ratings marked on a scale of 1 to 5, where 1 is the lowest rating and 5 is the highest. The difference between the importance rating and the satisfaction rating also has been included as a measure of how far short of expectations supplier performances are currently falling.

EXHIBIT V-5

User Expectations for and Satisfaction with Applications Software Support Services (by Country and Source)

Factor	Average Rating for Each Country Market*						All Europe Rating
	West Germany	France	United Kingdom	Italy	Scandinavia	Rest of Europe	
Importance	4.7	4.9	4.6	4.8	4.7	4.8	4.8
Satisfaction	3.6	4.8	4.0	3.7	4.6	4.6	4.3
Difference between Importance and Satisfaction†	23%	2%	13%	23%	2%	4%	9%

Factor	Average Rating for Each Support Source*						All Sources
	In-House	Equipment Supplier	Software Supplier	Professional Services Vendor	VAR/OEM	Other	
Importance	4.8	4.9	4.9	4.4	5.0	5.0	4.8
Satisfaction	4.3	4.5	3.8	4.3	3.0	4.5	4.3
Difference between Importance and Satisfaction†	9%	8%	24%	2%	40%	10%	10%

*Scale of 1 to 5, where 1 is the lowest rating and 5 the highest. Average standard error 0.06.

†As a percentage of importance

Overall, the importance ratings are high and the satisfaction shortfall is only 9%. Examining individual countries shows that:

- France has the highest satisfaction rating and shares with Scandinavia the lowest shortfall between importance and satisfaction (2%).
- West Germany has the lowest satisfaction and shares with Italy the largest difference between satisfaction and importance (23%).

Comparison between sources of maintenance gives an indication that the Importance rating for in-house or systems-house supplied systems is not as high as that for products supplied by equipment or software vendors:

- Software product suppliers have a significantly lower satisfaction rating (3.8) than do other sources except for VARs/OEMs (3.0, although the VAR/OEM sample was small).
- Professional services firms have the smallest difference between the two ratings.

A number of comments from the users themselves can aid in the interpretation of these figures:

- 'It is sometimes difficult for our software suppliers because of the modifications we have made to their products.'
- 'Because of the modifications made to products it would be nice if there was only one agent responsible for all changes.'
- 'We pay \$800 per month to a systems vendor and they do all our support, including putting up new releases.'
- 'IBM has (very) good support services'—(3 French respondents).
- 'We might use a third-party supplier.'
- 'The VAR admits there were problems with the original development. Some cannot be easily solved.'
- 'In-house support is done by one person who is too busy. Granada backup is too slow, a question of geography.'
- 'All/most maintenance is done in-house using source code provided by the supplier'—(5 respondents).
- 'We have a separate department for software maintenance.'

- 'Services are provided by our Head Office; we contact them if there is a problem'—(2 respondents).
- 'Speed of response has declined'—(2 respondents. One would prefer to go in-house.)
- 'There were problems in the initial year after installation.'
- 'After two years of implementation, support now ranks high priority.'

Exhibit V-6 illustrates users' views, by country market, of where their major problems lie. Almost two-thirds of the sample claim to have no major problem. The areas of general complaint are:

- Response times after problem notification (to a lesser extent, repair and fix times)
- Software performance and functionality is the second-most often mentioned complaint area in 1989, whereas in 1987 it was not cited as significant.

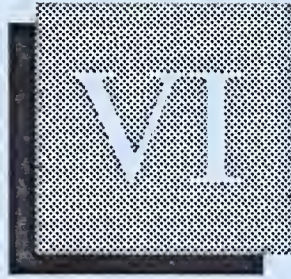
In 1989, Italy was again the country showing the most problem perceptions, while the responses from the Benelux countries have improved the most since 1987.

EXHIBIT V-6

User Perceptions of their Major Support Problems

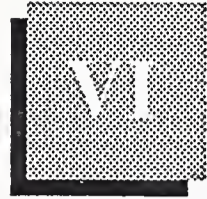
Problem Area	Percent of Respondents Mentioning						All Europe
	West Germany	France	United Kingdom	Italy	Benelux	Rest of Europe	
<u>Product Orientated</u>							
Software Performance or Functionality	18	0	0	7	12	2	5
Software Reliability or Quality	4	3	-	-	6	2	2
Documentation	-	-	-	20	-	-	2
<u>Service Orientated</u>							
Implementation	4	-	-	-	-	-	1
Response Times	7	8	21	27	6	7	11
Repair/Fix Times	4	3	3	7	6	5	4
Service Quality	-	-	10	-	6	5	3
Cost	-	-	-	-	-	5	2
Others*	-	-	-	6	-	5	2
Little or No Problems	57	80	62	47	47	65	63
No Comment/ Don't Know	11	10	-	-	12	-	5

*Includes: Keeping up with changing user requirements, remote diagnostics technical problem with access, lack of hardware spares, lack of supplier support staff



Software Maintenance Issues





Software Maintenance Issues

A

Definition of Support and Maintenance

In the context of software, confusion exists between the uses of the words maintenance and support.

INPUT's definitions of the two distinguish between support (which is single-customer orientated) and maintenance (which is multicustomer orientated). A vendor supports its customers but maintains its products for its whole customer base.

Exhibit VI-1 lists the tasks that lie on each side of the interface between the customer and the product.

Support is tied to the sale and ongoing customer relationship. It covers three stages in this relationship:

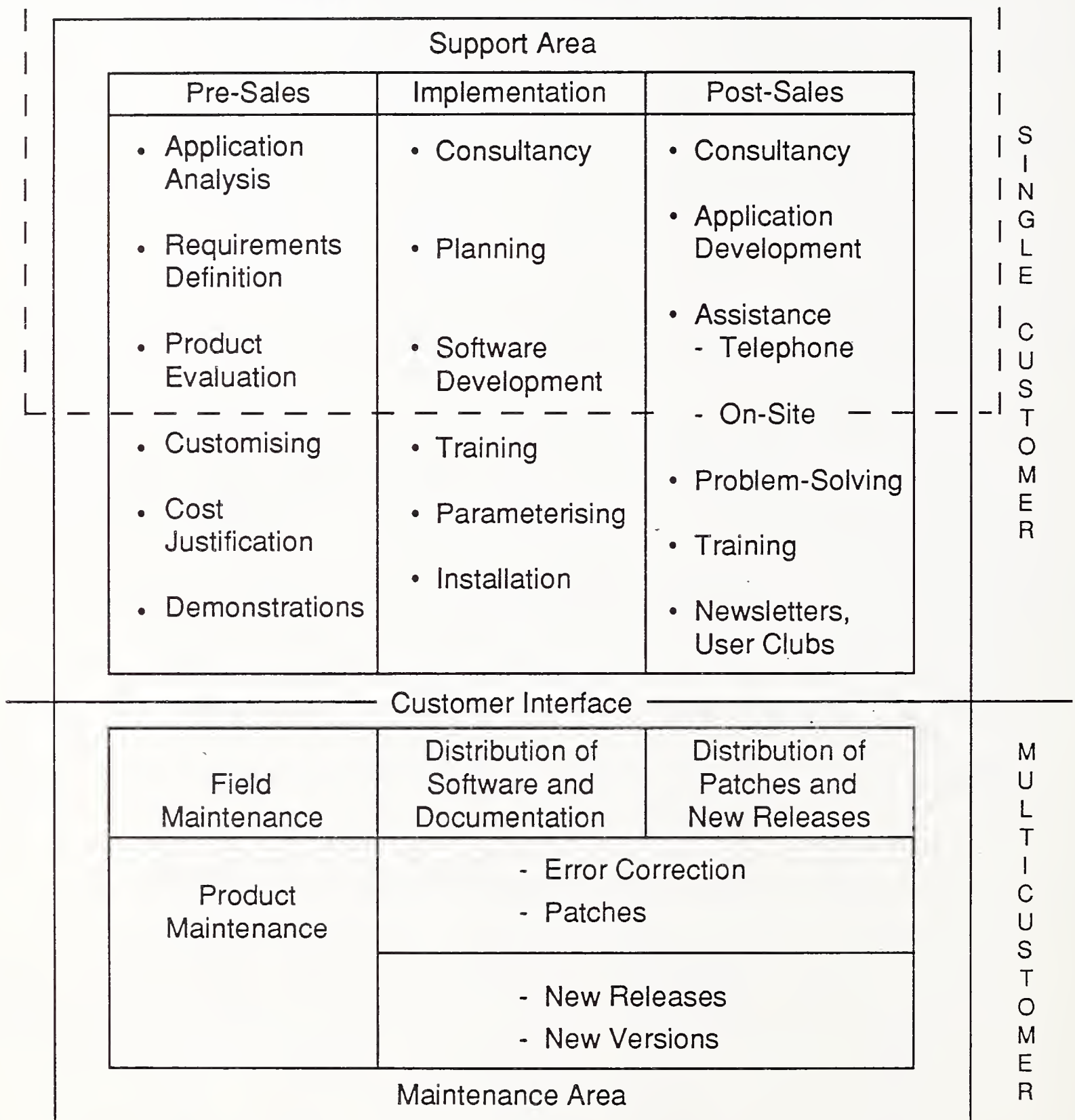
- Pre-sales—Demonstrations, requirements analysis, product evaluation and training
- At installation time—A range of tasks are required, depending upon the implementation and degree of customisation for each product
- Post-sales—Problem solving and consultant assistance on an ad hoc basis either by telephone or on-site, and regular information on product developments

The peak requirements for support centres on:

- The installation period
- The time for a major upgrade

EXHIBIT VI-1

The Boundaries between Software Support and Maintenance



On the other hand, maintenance is connected to a range of product-orientated tasks:

- Distribution of software copies and the associated documentation
- Distribution of fixes, patches, new versions (both maintenance versions and intermediate versions) and new full releases of the products
- Problem identification and correction:
 - Temporary (i.e., a fix is required to keep a user up and running)
 - Permanent (i.e., patches are distributed throughout the installed customer base)
- Development of intermediate versions, their scheduling and production
- New full releases of the software (i.e., usually distinguished from new versions by an increment in functionality and/or an improvement in the design)

Grey areas lie in between the two concepts:

- The difference between a fix and a patch can be hard to distinguish.
- Identification of errors involves disentangling operator (user) errors from product bugs.
- New releases may contain corrections to previously reported errors as well as new functionality resulting from the analysis of user requirements fed back to central software production.

Although it is only theoretically possible to disentangle the two (support and maintenance), it is still a necessary intellectual exercise, as it helps the vendor to focus on the services that can be delivered.

Maintenance can involve changes to a software product at three levels:

- Enhancements, e.g., the changes to tax rules brought about by legislation
- Intermediate software releases, e.g., mainly corrections to reported errors and modifications to achieve good performance levels
- New versions in which the main emphasis is on either new amounts of functionality in the product or a new design with the objective of providing both new functionality and integration into an architecture to give better overall performance

There will be a continuing need for support, maintenance or systems services contracts, if only to define the obligations on both sides in this otherwise confusing commercial area.

Exhibit VI-2 shows the feature analysis of product maintenance contracts as currently applied to application software. The breakdown is across the geographic markets studied:

- France, the U.K. and Italy have among them the contracts with the highest percentages of the features researched.
- Except for Remote Diagnostics, all features have, since INPUT's 1987 research, increased their penetration in offerings at the overall European level, indicating the increased formalisation surrounding application software.
- The new Problems Database Access feature, whereby the vendor makes its own trouble-shooting expertise available, has undergone significant growth.

Some contracts are for higher levels of support than others. Fault Reporting Only, Free Enhancements and Discounted Enhancements may co-exist in one user's set of contracts, if one level of support is taken for some of its products and a lower level for others.

Some vendors offer more than one level as standard. Some offer one standard level and anything additional is by special quotation. User comments on their contracts included the following:

- 'We have an AS/400 with a problems database for the S/36, which we use for our converted programs.'
- 'Trouble-shooting on-site was only needed immediately after installation.'
- 'Training discounts only come as special offers, i.e., when they find they have spare places to fill on courses.'
- 'On a full new release, our supplier will install the updates.'
- 'There is a separate introductory implementation contract.'
- 'Remote Diagnostics and the Problems Database are only rarely used.'
- 'Visits were only needed during installation.'
- 'Updates are not free, but we still get them.'

EXHIBIT VI-2

User-Reported Probabilities of Inclusion of Features in Applications Software Maintenance Contracts

Feature	Percent Probability of Feature Being Included in Contract							
	Country Market						All Europe 1989	All Europe 1987
	West Germany	France	United Kingdom	Italy	Scandinavia	Rest of Europe		
On-Site Trouble Shooting	55	99	69	80	66	93	82	74
Telephone Support	81	96	97	37	71	79	82	76
Free Enhancements	56	87	65	72	57	69	71	71
Consulting Visits	47	61	74	70	57	69	64	51
Fault Reporting Only	57	73	34	100	14	49	55	36
Discounted Enhancements	53	66	41	80	16	55	54	36
Remote Diagnostics	44	55	57	47	34	48	50	54
Discounted Training	32	51	34	73	31	44	44	43
Problems Database	31	50	52	65	16	39	43	-
Other (e.g., Update Installation, Magnetic Media, Performance Measurement Utilities)	5	14	-	15	14	-	7	15

Average standard error 9%

Exhibit VI-3 compares the feature satisfaction ratings between the equipment vendors and the independents from INPUT's 1989 research and from the 1987 report. In the two-year period:

- Five out of the 10 features rated have improved in the eyes of the users.
- In four cases the equipment suppliers have improved their ratings, while the independents have marginally got worse (though within the statistical validity of the sample error).
- In only one case (Ease of Modification) do both types of supplier rate worse than they did two years ago.

The weak spots remain in the same areas:

- Documentation, although the equipment suppliers have made a marked improvement here
- Ease of modification (the further use of application packages will accelerate this deterioration)
- Training

B

Maintenance Contract Pricing

The breakdown by the different charging methods for the maintenance of applications products by contract is shown in Exhibit VI-4, as reported by users in 1989 and in 1987 across all Western Europe:

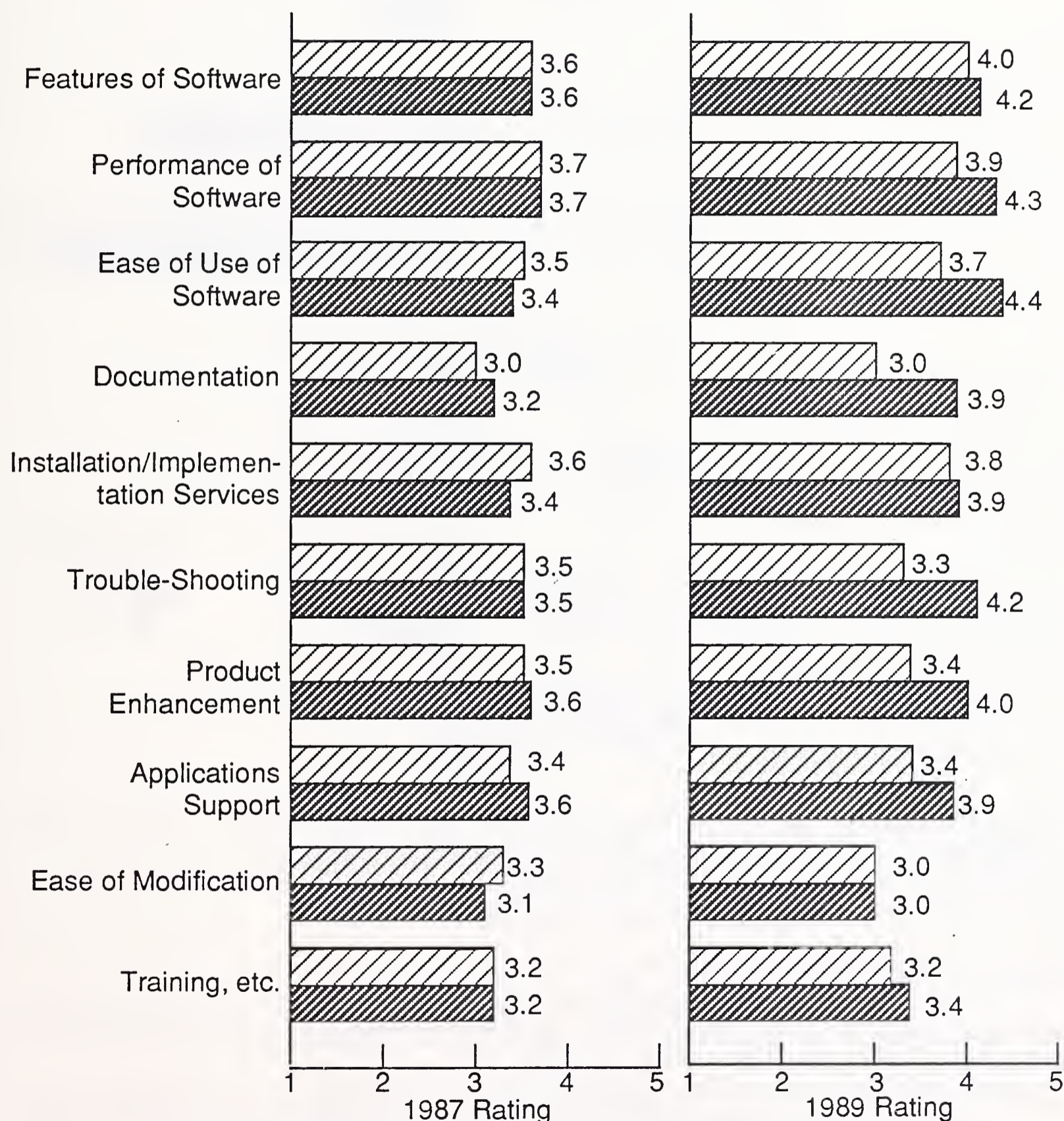
- The principal methods reported are those where a fee is raised, calculated upon a percentage of the licence fee, whether it be an initial licence or one paid for on a periodic charge.
- A significant percentage (22% of sample) now have their software support charged for on a fixed annual fee basis. This may be a fee that varies according to product, or one at a set level irrespective of product.

The use of the percentage of a one-time fee method has fallen since INPUT's 1987 research, in a way which has not affected the regular fee basis method.

The number of products whose support is bundled into the licence charge has also fallen, although vendors report greater use of this bundling philosophy, albeit principally for system software products. The number of unsupported products is now reported at a higher level.

EXHIBIT VI-3

Satisfaction Ratings for Features in Software Maintenance Contracts (Equipment Suppliers versus Independent Vendors)



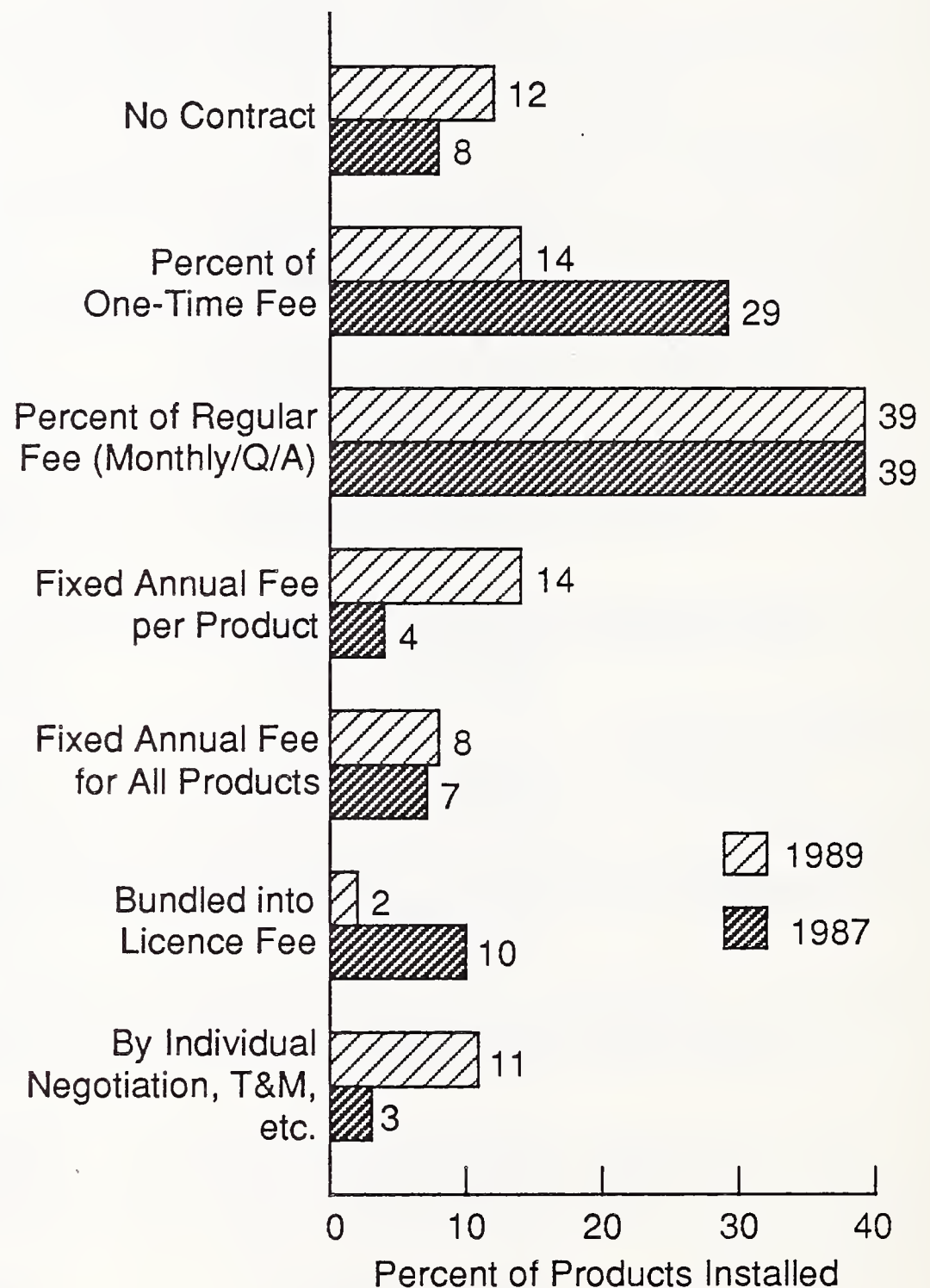
▨ Independents

▤ Equipment Suppliers

Range of Standard Errors: 0.05 - 0.15

EXHIBIT VI-4

User-Reported Changes in Charging Methods for Applications Product Maintenance Contracts



Exhibits VI-5 and VI-6 show tabulations for the range and the average support contract price levels recorded by users and vendors respectively:

- The charts have only analysed prices recorded as a percentage of the licence fee method, although it was noted that the market as a whole was moving away from a pure percentage fixed fee per product calculated on a cost plus or other basis,

- It was not possible to make an exactly similar breakdown in both cases of user and vendor.

EXHIBIT VI-5

User-Reported Maintenance Charges Priced as Percentages of Licence Fees
(by Country Market)

Country Market	Percentage Charges Quoted			
	Actual		Average	
	From	To	Minimum	Maximum
West Germany	12	20	14.0	17.5
France	8	15	10.5	15.0
United Kingdom*	-	-	-	-
Italy	5	15	8.0	13.0
Scandinavia	11	20	13.0	20.0
Rest of Europe	5	15	8.7	12.2
-Benelux	10	15	10.0	13.3
-Spain	5	15	6.0	11.0
All Europe	5	20	10.2	13.9

*No U.K. respondents answered this question.

Exhibit VI-5 provides a breakdown of the country markets of Europe and compares the range of fee percentages quoted. Exhibit VI-6 tabulates both the equipment vendors and the independents against support price levels for system and application software:

- The equipment vendors charge less than the independents for support.
- The difference between the charges for system and application software have widened since INPUT's previous research in 1987, with the trend being for system software support to fall in price while application software prices rise.

EXHIBIT VI-6

Vendor-Reported Charging for Product Support/Maintenance

Type of Vendor		Maintenance as a Percent of the Licence Fees			
		Systems Software		Applications Software	
		Lowest	Highest	Lowest	Highest
Equipment (Range)		5	22	10	25
Independents (Range)		7	28	10	40
Both Types	Range	5	28	10	40
	Average	7	15	11	19

The vendors' figures, which range between 7% and 19% per annum of equivalent licence charges, correlate reasonably well to the users' figures. The increase over the users' quoted percentages reflects the fact that the vendors use the list prices as opposed to the user quoted figures, which are more likely to relate to the actual contracts negotiated.

A very wide range of prices for fixed fee maintenance charging was quoted by the midrange users. These prices were for contracts to maintain a suite of programs covering one or more applications. They were not per-product prices.

- In West Germany, 'We pay DM 20,000 (approximately \$10,600) per annum per workstation for maintenance and support'.
- In France prices quoted per month ranged from FF 4,000 (\$625) to FF 15,000 (\$2,350), equivalent to between \$7,500 and \$28,000 per annum.
- In Belgium, minimum annual amounts were quoted as between BF 270,000 (\$6,800) and BF 480,000 (\$12,000).
- In Italy, annual charges ranged from Lit 50 million (\$36,000) to Lit 200 million (\$144,000).

- In Spain, a charge of Pta 4 million (\$34,000) per annum invoiced quarterly was quoted.

Other user comments on support charging were recorded:

- 'A one-year warranty applies, but from the second year we are suffering from the 10% annual rise in the product list prices.'
- 'We get a high discount because of our connection to the large Volvo group.'
- 'Our fixed monthly fee is revised annually and usually goes up between 3% and 4% each time.'

C

Installation and Warranty

The software commissioning phase is the most critical period for the user. The vendor (whether an equipment vendor or an independent supplier) often has to cover its activity costs for this phase out of the licence fee and any additional training charges levied.

The long-term trend has been to use training as a form of cost externalisation during the commissioning phase. It has the effect of putting the onus on the buyer to use the purchased product effectively, thus limiting the degree of questions likely to be raised with the supplier or at least allowing those questions to be accurately phrased and focused.

Most system software is now user-installable. If the product is in the public domain, it is also possible to have an independent supplier support it. It is increasingly common for service offerings to allow for updates and new releases to be supplier-installed as an option.

There is a growing independent support market for IBM system software. This is being satisfied by the plug-compatible suppliers (Amdahl for example) and independent consultancies such as Synapse in the U.K.

Installation support required for application software will vary with:

- The size and complexity of the product
- The complexity of the user's application requirements

With application software, there is more opportunity for selling additional support services for installation assistance than is the case for system software.

Warranty on software remains a difficult subject. Current practice is to offer up to one year on major products. This practice means that the licence fee must cover the costs for the vendor's first year call-out activi-

ties, and explains the market's move toward the use of initial fees as the complexity of user systems increases with time.

Extended warranty can be used as a user lock-in device but can act against the vendor if it makes the vendor less able to justify an ongoing support charge that is customer- rather than product-orientated. Thus, vendors should carefully examine any proposals to increase the warranty period offered; an increase in professional services capability is a more positive way of gaining competitive advantage through flexibility.

Exhibit VI-7 lists some of the vendor comments on the methods adopted for installing products and implementing application systems.

D

Ongoing Support

After successful product commissioning the users' needs are:

- Good documentation (To date, documentation has been an area receiving insufficient funding and priority.)
- Assistance in developing the operational use of their products within an overall system
- Information to help them understand vendors' product enhancement programmes
- Consulting visits to allow them to co-ordinate their application design work with machine developments
- Advice on the installation of new releases

The vendor needs a contract to cover the majority of these activities but it must also have in place a basic level of free-of-charge maintenance to cover certain aspects:

- Fault reporting
- Provision of fixes, even up to the on-site trouble shooting level
- The ability to satisfy customers selectively, e.g., those that only want to receive fixes and not enhancements
- No penalty for having no support contract, but possibly a price penalty for upgrading to full support after the end of the warranty period when compared with taking out a contract immediately after acceptance
- If more than one support level of contract is offered, there must be continuity of the support level across the end of the warranty period—This is another way of encouraging users to go for the early purchase of a support contract

EXHIBIT VI-7

Vendor Comments on Installation/Implementation

- Mostly we encourage the user to do it where possible. Training is available.
- Technical/application support teams are mostly organised by line of business.
- Part of our culture — we develop, configure, install and support all the customer needs
- Project teams do both as parts of the projects.
- We install all the hardware and software — some customers want extras so we charge them for those, e.g., trials, acceptance tests.
- All operating systems and applications software are installed/implemented on-site free of charge except for commodity PC software and third-party software.
- The project group does this but we are moving towards the hardware people doing it and user-installable software in future.
- Majority of users do it themselves by down-loading or mail. If users have a software update agreement then installation is 'free of charge'.
- Daily rates through to full turnkey.
- Majority is installed by us (our own software); the rest is user-installable.
- Installation is done as part of a project, whereas implementation is usually T&M on an estimate.
- We consult to satisfy customer's needs at whatever level is appropriate and charge T&M for it — usually for customising and integrating.

The last two aspects mean that selling of the support/maintenance contract must go hand in hand with the selling of the product.

INPUT advises vendors not to have more than two levels of chargeable support. Exhibit VI-8 lists vendor comments on their charging schemes. Up to six service levels are cited by one respondent. The majority appear to want to simplify their offerings.

E

Other Chargeable Services

Vendor comments on the type of extra services they consider necessary to offer included the following key point: increasing use of joint venturing between each other and with the professional services and consulting companies.

The fact that the majority of extra services are associated with the initial installation period highlights the difficulty of being able to charge later for ad hoc bits of work that might exceed the definition of free support and maintenance. This difficulty reinforces INPUT's belief in the use of a professional services activity as a separate revenue stream to service the need for on-going support needs.

INPUT recommends that, if possible, only one level of user support contract is offered for application products, and certainly not more than two levels. Providing only one chargeable support contract level still leaves the user with adequate choices (i.e. three options):

- A basic free-of-charge bug fixing service (but with no support contract and no on-going enhancements)
- A support contract, in which the user can get bugs fixed and be sure of keeping up to date with the latest versions of the software
- A combination of these two, with the use of ad hoc professional service assistance at the vendor's current daily rates, or from a third-party software house

Exhibit VI-9 shows the ranking of European users' suggestions for inclusion of further chargeable services. As might be expected, users did not easily come forward with their ideas. In fact, the majority reported to be looking more to improve present service or to leave 'well enough alone'.

INPUT's recommended techniques for improving vendors' image in terms of support are:

- Increased use of consulting visits

EXHIBIT VI-8

Vendor Comments on Maintenance Charging

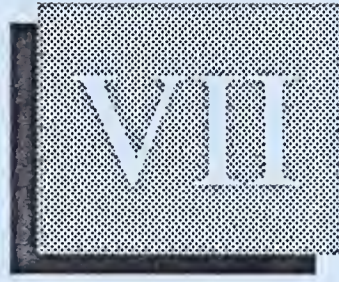
- Annual fees based on size of machine (PC connectivity) and software package purchased
- Three levels of support offered with rates varying by type of product
- Three levels of annual support charges as a percentage of one-time licence fee
- Annual fees varying by size, complexity of product and tailored support level required. Three levels of support
- On-line remote diagnostics included in Network Management Service
- Six levels of support optional with monthly or annual maintenance payments as percentage of initial one-time fee
- Replication incurs annual fees as a percentage of current fees. Some standard products have gratis maintenance; enhancements are at T&M rates related to development costs. Standard maintenance can be customised.
- Standard maintenance only
- Bespoke is negotiable at renewal time. Annual contract is mandatory on turnkey systems. Levels of support vary with product prices.
- Varies with product or system
- Support for systems software is not chargeable — the user can pay a premium for priority treatment.
- Product dependent for applications. New releases sent automatically.
- One contract only

- Arrangements with third-party suppliers to achieve this if the vendor is himself resource bound
- Use of a very high level of consultant to establish 'a more caring image'

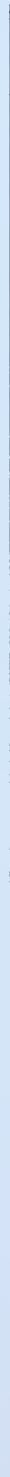
EXHIBIT VI-9

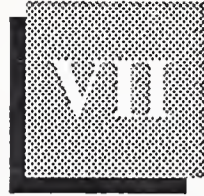
Chargeable Services Acceptable to Users as Additional Unbundled Options

Class of Service	Rank
Education and Training	1
Consulting	2
Systems Integration and Turnkey	3
Installation/Commissioning Services	4
Systems Development	5
Customisation of Software Products	6



Future Opportunities





Future Opportunities

A

Market Trends Affecting Product Maintenance

Exhibit VII-1 lists the principal factors that affect the growth of the software products maintenance market. The chief driving forces are:

- The growth of the installed base
- The increasing use of the application package approach
- The increased reliance that users now place on systems to aid in the running of their organisations.

The inhibiting factors cluster round the attempts by vendors to make their overall offerings more attractive by bundling or pushing users into a professional services contract situation.

In the mainframe area, CASE technology (which offers hope for easier software maintenance) is set to move steadily towards greater recognition, as case studies of successful implementations become more numerous. Much resistance to CASE still exists. INPUT's 1988 research revealed that only 15% of a sample of large- and midsize users in the U.K. had adopted CASE at some level of involvement, with another 8% showing interest in the form of tendering or mounting pilot projects.

With the initial enthusiastic reception given by the industry to the IBM AS/400, there is a definite trend, fostered by IBM, towards the use of application packages for a user that cannot wait months or years for its systems to be commissioned. The use of CASE tools is also finding favour in this area, especially in the Digital VAX user base, where custom-built software has a long tradition.

The UNIX server and workstation sector is also looking to the use of application packages to continue its current sales momentum. Most

EXHIBIT VII-1

Factors Affecting the Growth of the Software Products Maintenance Market

Drivers

- Growing installed base of software products
- Increasing use of products in finding a software solution
- Linkage of software maintenance fees to the current product licence fees
- Higher penetration of maintenance contracts
- Emergence of the systems maintenance market
- Increasing criticality of the software component of systems

Inhibitors

- Bundling of the software and hardware maintenance functions
- Bundling of maintenance into the product licence fee
- Increasing recourse to a professional services contract to satisfy many support requirements
- Overlap between the software maintenance and software enhancement phases in the overall life cycle
- Adoption of advanced development tools
- User inertia towards signing a maintenance contract

equipment suppliers moving into this field are drawn by the presence of these products, whose numbers worldwide are now starting to reach the thousands.

In the majority of the CASE tools brought to market to date, the accent has been placed on the analysis and design phases of the life cycle. Savings in maintenance costs have been often mentioned as a spin-off benefit, but the only perspective that tries to address the maintenance portion of the life cycle more closely is that associated with reverse engineering tools, which are designed (in their first generation implementations, at least) to allow for the examination and restructuring of, chiefly, COBOL code.

The new term IMSE (integrated maintenance support environment) has now been coined to complement the earlier IPSE (integrated project support environment). It is not yet clear to the market what the relationship between these two is or should be. From one viewpoint they could both be the same type of overall project control assisting system, one supporting the initial development and the other the system in its maintenance phases. Unanswered questions are as follows:

- Do they reside in different environments, the IPSE in a development machine, the IMSE in the target environment?
- Will they both use the same data dictionary or repository? If not, how will they communicate with each other, if at all?
- Most important, will they be used by the same or different teams of systems staff?

The matter of how users are organised for software maintenance is obviously key to the marketing and management of support services.

Exhibit VII-2 summarises some of the key support trends reported by INPUT's user research among midrange users. Some contradictory statements appear in the list:

- More telephone problem-solving versus more on-site or on-line problem-solving
- Large vendors are helpful versus growth that is too fast which can injure the service provided.

EXHIBIT VII-2

**Comments on Software Support Trends
Noticed by Users**

- We are getting offers of telephone and remote diagnostics.
- As long as the quality is okay, I am not interested in the trends.
- We are changing to PCs and will not be so interested in support problems.
- System/34 is old and IBM does not innovate any longer in supporting it.
- Bull seems to have improved its support recently.
- We are experiencing a trend towards less on-site problem solving.
- We are noticing a trend away from telephone problem solving.
- We see a trend going towards PCs and workstations.
- Suppliers grow and with them their resources. There are therefore fewer packages, which is attractive.
- Suppliers are growing too fast; not enough skilled people.
- More high-level applications make it easier to maintain systems.
- 4GLs are becoming more important.
- There will be less maintenance in future; more do-it-yourself.
- More remote diagnostics.
- Vendors demand higher and higher rates per hour.

Users reported on the attractiveness of the trends by preferring, in order of preference:

- More remote diagnostics
- More telephone problem-solving and more on-site problem solving (equally second)

Future options found least attractive, in order of most distasteful, were:

- Methods of discounting support
- Unbundling
- Third-party support offers (mostly recorded in the U.K. and West Germany)

B

Evolution of Maintenance Delivery Mechanisms

Trends in software provision will also have an impact on the delivery of the software maintenance component:

- Currently, in-house bespoke software is constrained by the number and calibre of systems staff on the open market. The endemic skills shortage in some European countries and high staff turnovers create an opportunity for a maintenance supplier to offer relief from the maintenance work load, either temporarily during a major shift in in-house computing policy or on a more regular basis.
- Bespoke software systems commissioned from outside contractors are increasing in contract size—note, for example, the growth of large systems integration projects. These projects as well as the smaller ones commissioned from professional services companies and VARs (value-added resellers) are part of the original supplier's captive market and their support contracts will remain part of it too.
- Maintenance of application packages is the major growth area for products. Although the overall European growth rate for products was reported by the sample to have slowed down (from 20% to 15% per annum), expenditures on maintenance is claimed to be accelerating. Vendors reported higher average growth rates (7 1/2% per annum currently) than the users (6% per annum overall) in Europe. Professional services vendors report even higher current growth rates for software maintenance of up to 30% and higher per annum over 1988 on a quarter-on-quarter basis. These rates reflect large bespoke system maintenance contracts.

C

Emergence of a Maintenance Tools Market

Only a handful of application development tools are currently targeting the maintenance portion of the product life cycle.

The three mentioned in INPUT's 1989 vendor sample are INSIGHT, PM/SS and METASYS. Specifically, these tools are aimed at the maintenance phase of the life cycle. There are also a number of reverse engineering tools and testing/quality management tools, which could be used in both development and maintenance phases.

Mainstream integrated-CASE (I-CASE) products such as MAESTRO, CORVISION and FOUNDATION all claim the increasing ease of maintaining target program code and documentation produced by their toolkits as a major benefit, but in their current versions do not have specific functions addressing the maintenance area itself.

D

Third-Party Software Maintenance

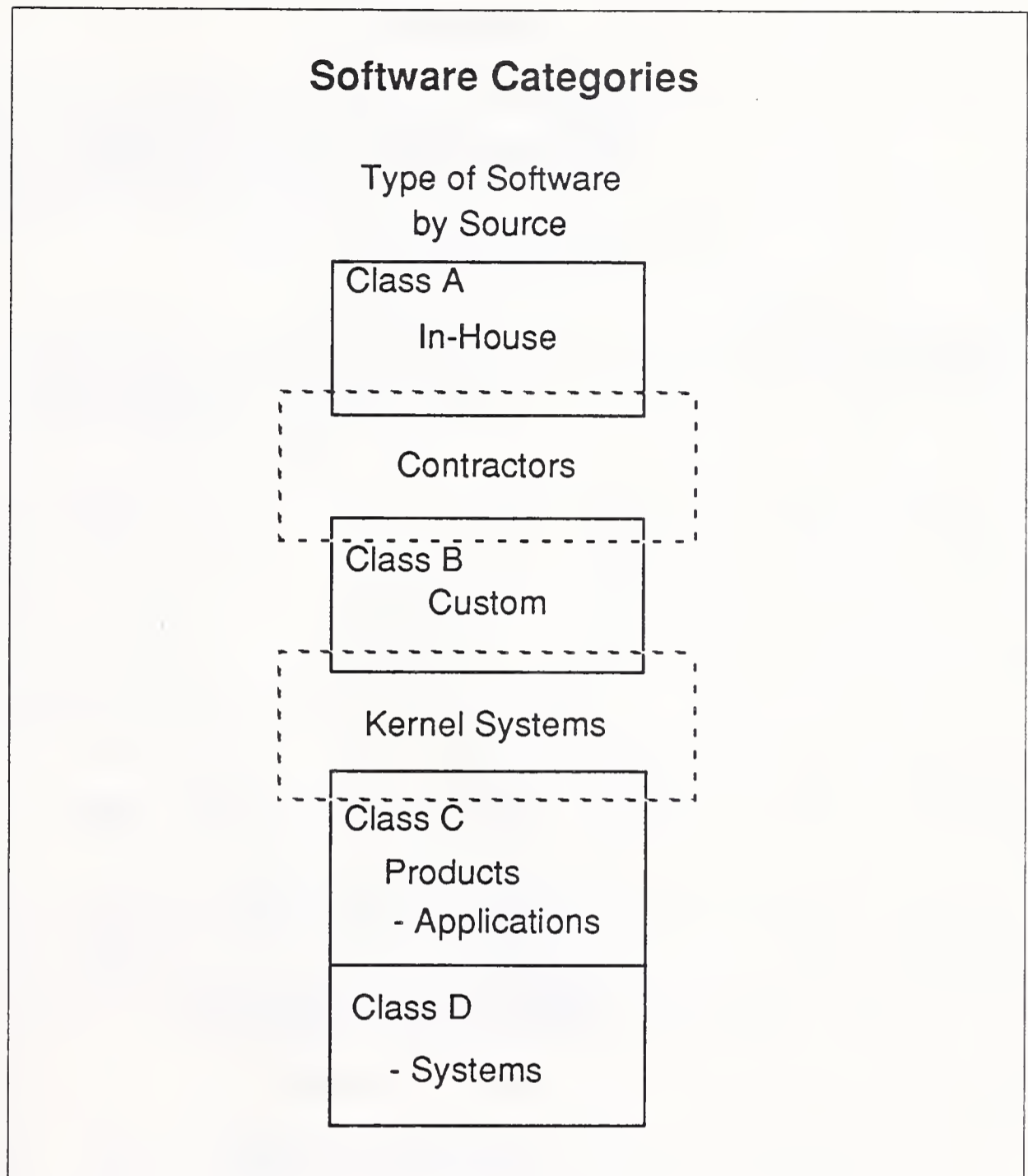
It is possible to view the software maintenance business in the wider context of all types of software, both product and bespoke, whether produced in-house or purchased externally.

For the purposes of defining major market segments for the application software maintenance business, INPUT has adopted the categories illustrated in Exhibit VII-3:

- Class A refers to software developed by in-house systems teams and is not currently regarded as part of the open market for software provision; hence it is marked as captive or unavailable in the market sector column.
- Class B refers to all software commissioned from an external agency (such as a professional services company or VAR) to be built on a custom basis, i.e., to a particular user-defined specification. This is normally measured as part of the professional services sector, (along with consultancy, education & training, contract staff and recruitment). It also has elements usually measured in the systems integration and turnkey systems sectors.
- Class C refers to application software products and packages, as shown on the definitional map in Exhibit III-2.
- Class D is the equivalent of Class C except for system software products. Both of these last two classes are measured as parts of the software products sector.

In the remainder of this report, these four classes are referred to by their initials (A, B, etc.). Bridging the gaps between in-house and externally

EXHIBIT VII-3



commissioned bespoke software, the chart shows the role of contract programming staff. Kernel systems, an important technique and selling tool for the major professional services vendors that do not market fully productised systems, plays a similar role in bridging custom and package solutions.

Conceptually, maintenance can be extended to cover the repair and renovation, and in some cases, the functional enhancement of all the types of software found on the definitional map in Exhibit III-2.

1. Providing Software

Exhibit VII-4 tabulates the European market by platform type for both providing and maintaining product software. Exhibit VII-5 tabulates the European market as viewed in the wider context outlined above for the provision of software from all four sources (classes A-D), broken down by country.

EXHIBIT VII-4

1989 Western European Software Market by Type of Equipment Platform

Software Product Segment	Market by Platform Type 1989 (US\$ Billions)			
	Mainframe	Mid- range	PC	All Platforms
Licences				
Systems Software	4.29	2.25	1.15	7.69
Applications Software	0.75	1.72	2.26	4.73
Total	5.04	3.97	3.41	12.42
Maintenance or Support				
Systems Software	0.70	0.34	0.14	1.18
Applications Software	0.12	0.28	0.25	0.65
Total	0.82	0.62	0.39	1.83
Total				
Systems Software	4.99	2.59	1.29	8.87
Applications Software	0.87	2.00	2.51	5.38
Total	5.86	4.59	3.80	14.25

EXHIBIT VII-5

The Market for Providing Software

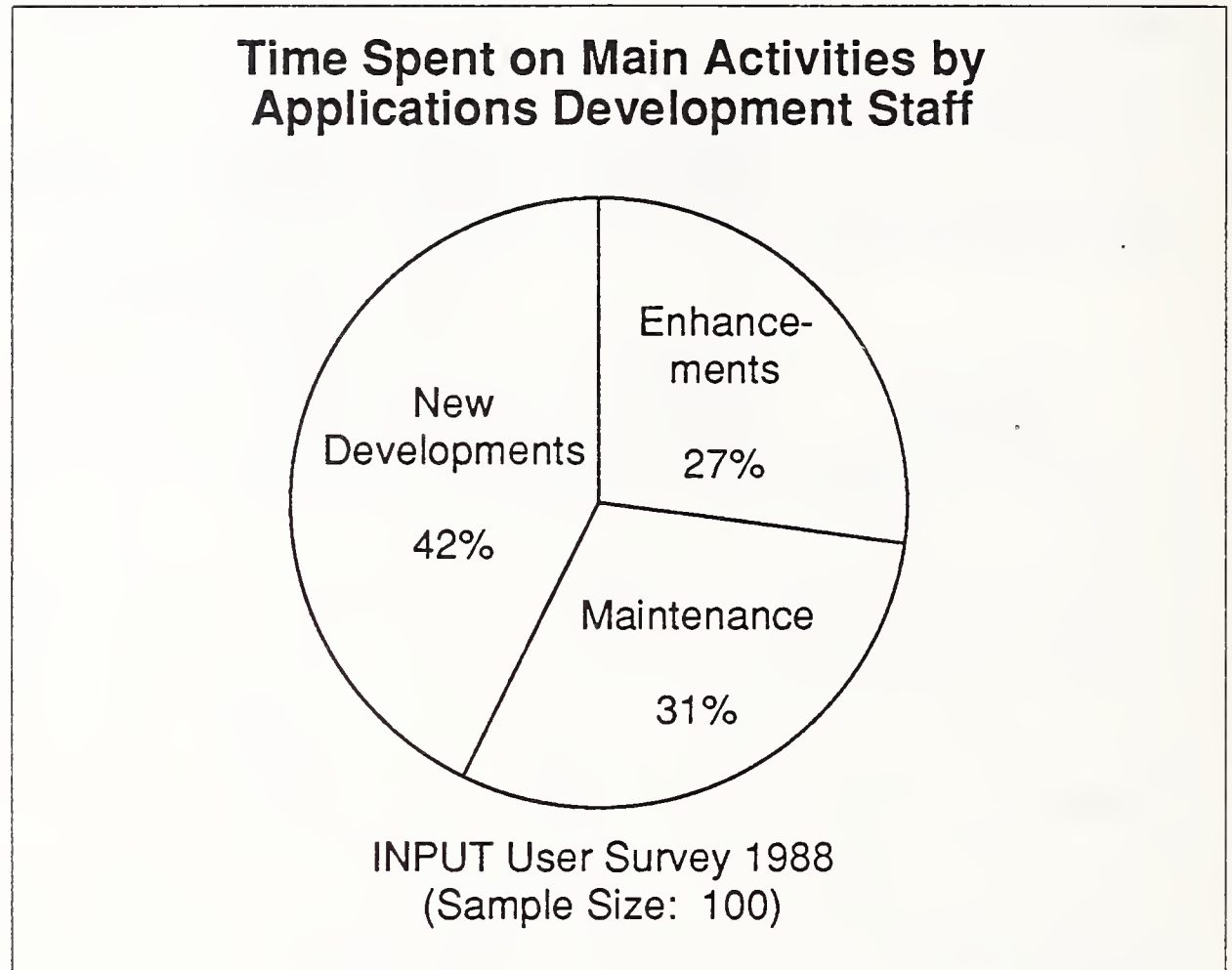
Software Segment	Western European Market, 1988 (US\$ Billions)						All Europe
	West Germany	France	United Kingdom	Italy	Scandinavia	Rest of Europe	
Custom							
A. In-house Produced*	5.33	4.16	3.14	3.56	2.06	4.96	23.20
B. External Contractor	1.47	2.84	1.87	1.08	0.70	1.16	9.12
Product							
C. Systems Software	1.18	1.51	0.98	0.94	0.54	1.12	6.27
D. Applications Software	0.70	0.91	0.60	0.57	0.33	0.68	3.79
Total External	3.35	5.26	3.45	2.59	1.57	2.96	19.18

*'Captive' or 'unavailable' market measured at overhead cost of applications systems staff

The 1988 Class A figure for software provision was calculated as follows:

- Estimated figures for the numbers of systems staff (both system and application programming) were obtained from national statistical institutes and national industry surveys. Where figures were not obtainable, estimates were based on pro-rating to the country markets for computing services.
- A proportion of development staff's productive time was allocated to new developments (as shown in Exhibit VII-6, which resulted from analysis of INPUT's 1988 research in user organisations) in two ways. First, new developments were taken both to exclude and include the 27% allocated by the research to enhancements. This gave a range of time spent from 42% (new developments only) to 69% (new developments plus enhancements).

EXHIBIT VII-6



- Multiplying the proportion of time spent by the number of staff doing new development and again by a factor for the average total cost—taken as \$48,000 per annum—yielded a range of market sizes, based upon the cost of providing in-house staff for development work.

For example: the market for in-house software = number of development staff x proportion of their time spent on development x an average salary

A figure in the middle of the range was taken as the figure for Class A, indicating that a proportion of enhancement work is to be considered part of the software development function.

The figures for Classes B through D were taken from INPUT's ongoing research during 1989:

- Class B from the professional services sector
- Classes C and D from the software products sector

As seen from the user's perspective, the overall expenditure on software provision is four times the market for software products alone. Hence the growth of the products sector to help to cope with the application backlog.

2. Maintaining Software

For software, which is installed as a product, it is relatively easy to discriminate between the provision and the maintenance of the software. With bespoke construction, this is by no means so easy, because the maintenance, enhancement and development phases of the overall life cycle tend to have 'fuzzy' boundaries with each other.

The table in Exhibit VII-7 shows the analysis, derived in a similar way to that in the previous exhibit but for the total market for maintaining software, for both applications and systems from both in-house and external production sources. Again, using the same method of calculation, a proportion of the enhancement time was put into the area of maintenance.

EXHIBIT VII-7

The Potential Market for Maintaining Software

Software Segment	Western European Market, 1988 (US\$ Billions)						All Europe
	West Germany	France	United Kingdom	Italy	Scandinavia	Rest of Europe	
Custom							
A. In-house Produced*	4.24	3.31	2.50	2.84	1.64	3.95	18.47
B. External Contractor	0.26	0.50	0.33	0.19	0.12	0.21	1.61
Product							
C. Systems Software	0.18	0.24	0.15	0.15	0.08	0.18	0.98
D. Applications Software	0.10	0.13	0.08	0.08	0.04	0.09	0.52
Total External	0.54	0.87	0.56	0.42	0.24	0.48	3.11

*'Captive' but potentially available for third-party maintainers to supply

The figures for Classes B through D were again taken from INPUT's ongoing research during 1989.

The in-house maintenance market is of the same order of magnitude as the in-house development market, but it swamps the external market by comparison, being six times its size. This sector is forecast to foster and support a healthy third-party maintenance element over the next five years, available to professional services and software product vendors.

The key point of difference to note between the provision or original development market and the maintenance market is that the in-house software (Class A) has the same rate of growth for both supply and maintenance, while the external market (Classes B through D) has different growth rates for maintenance than for the provision of the software in the first instance. This difference is due to the fact that the in-house markets' growth rates are tied to the cost of the salaried professional computer staff.

3. Market Characteristics

In 1988 the in-house market for the supply of software was greater than, but of the same order of magnitude as, that of the external mode of supply—\$23 billion for software constructed in-house against \$19 billion for externally purchased software development.

By 1994 the external segments will be more important, with \$47 billion against an estimated \$37 billion for in-house (calculated using an average increase of 10% per annum). This results from the growing use of packaged software and of software development tools on all types of platforms, with micro and midrange being the leading platforms for the use of the product solution.

The ratio of bespoke systems to products (currently around 3:1), will drop in the five-year period. Bespoke work is, broadly speaking, constrained by the slowly increasing population of professional systems staff, and the in-house market is largely linked to the year-to-year salary increases.

Maintenance exhibits a marked difference, as a function of whether it has been provided for maintaining external software purchases or for the renovation of software built in-house:

- Maintenance fees for products and bespoke systems vary broadly, between 7% and 25% per annum. This makes the size of the potential market for product maintenance an order of magnitude lower from the total market for the supply of the products themselves.

- In-house systems maintenance is costing almost a third of all manpower-based activities in the average IS department and may in many cases go much higher, to 50% or more.

Because of the difference in annual growth rates between maintenance and supply in the two cases—in-house and external—in-house will remain a potentially larger market for third parties in the foreseeable future. This key factor, which derives from the fact that it is easier to contain maintenance costs if there is an external contractor, dominates the entry-point position for would-be entrants into the third-party software maintenance (TPSM) market.

The present slow take-up of CASE technology, methodologies and tools will give way to a faster penetration in the next two years, with fastest take-up being experienced in the midrange and workstation areas, where there is a greater need for more commercial application software. This change to more formal methods of software in the search for both productivity and software quality presents an opportunity for third-party software maintenance vendors to offer services aimed at freeing the user maintenance teams to use more exciting or more rewarding activities associated with systems development.

As CASE technology takes root, this window of opportunity will start to close, due to:

- More user-friendly and up-to-date documentation being produced, particularly from IPSEs and I-CASE environments
- Greater user perception of the ease with which enhancements can be made with the aid of systems tools
- Increased blurring of the boundaries between development, enhancement and maintenance

Exhibit VII-8 summarises the forecasts for the overall software products segments of the market including both licence fees and maintenance and support charges. Maintenance and support is forecast to grow faster than the licence fees segment, as it is defined to include:

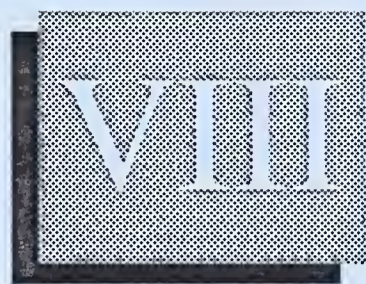
- Maintenance fees for licenced products
- Maintenance services, formalised and marketed as service products by hardware suppliers, professional services vendors and software products companies

EXHIBIT VII-8

Western European Software Products Market Forecasts, 1988-1994

Software Product Segment		Market Forecast (US\$ Billions)				
		1988	GR 1988-1989 (Percent)	1989	CAGR 1989-1994 (Percent)	1994*
<u>Licences</u>						
Systems Software		6.27	22	7.69	16	15.85
Applications Software		3.79	18	4.73	22	12.78
All Software		10.06	21	12.42	18	28.63
<u>Maintenance & Support</u>						
Systems Software		0.98	20	1.18	27	3.83
Applications Software		0.52	15	0.65	29	2.34
All Software		1.50	18	1.83	27	6.17
Total	Systems	7.25	22	8.87	17	19.68
	Applications	4.31	25	5.38	23	15.12
	All Software	11.56	23	14.25	20	34.80

*Forecasts for 1994 are in 1989 constant U.S. dollars.



Conclusions



Conclusions

A

Market Structure

This report has concentrated on the equipment platforms in the midrange, comprising systems larger than desktop PCs and multiuser microcomputers. In general, multiuser systems serving between 32 and 512 users have been addressed, but overlaps do occur at both ends of this range, particularly in the area of single-seat, networked, high-performance workstations.

Exhibit VIII-1 illustrates the structure of the software products marketplace by showing the distribution channels connecting producers to eventual end-users:

- Equipment vendors and distributors
- Turnkey systems suppliers, OEMs and VARs
- Software publishers, distributors and dealers

The midrange is characterised by a combination of hardware suppliers and independent software vendors, with both groups marketing directly and indirectly.

B

Market Findings at the European Level

Software products for general-purpose computers represents a \$14 billion market in Western Europe in 1989. This figure compares with a \$11 billion market for professional services, which includes consulting, tailored software development training and education and contract programming services.

Both these sectors of the computer services market offer means of achieving software solutions to business or technical problems. Both are growing at over 20% per annum.

EXHIBIT VIII-1

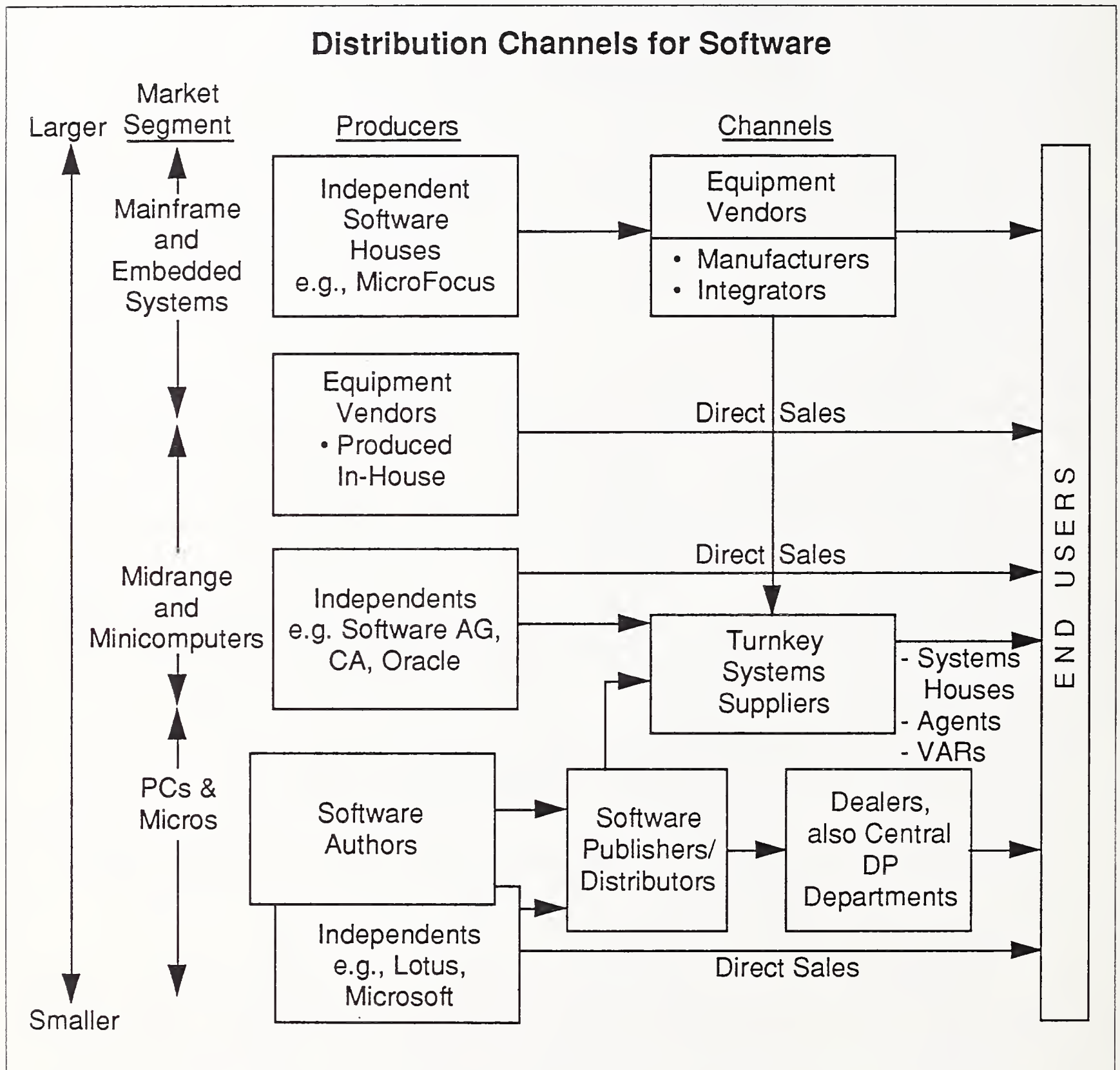
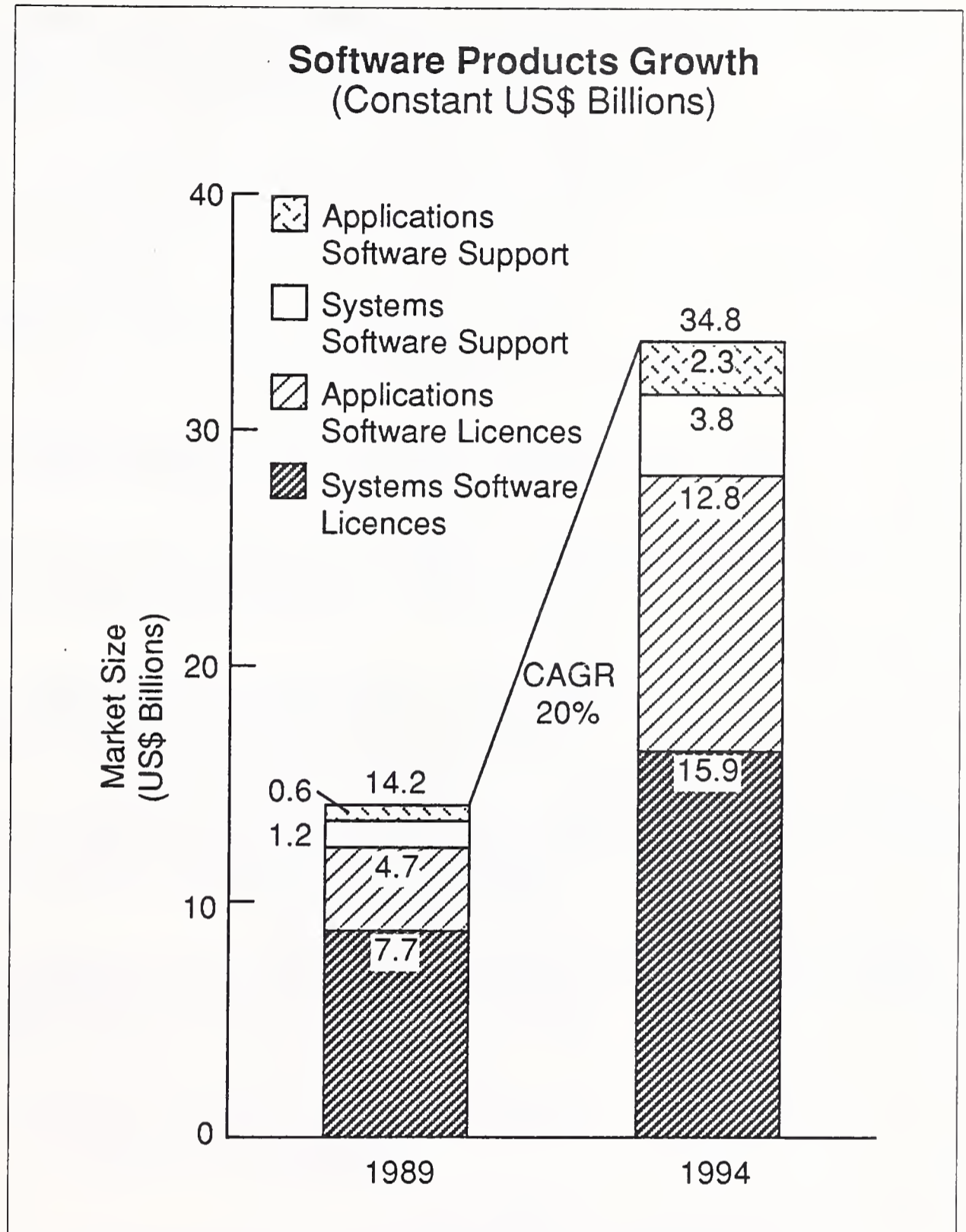


Exhibit VIII-2 summarises the five-year growth in the European software products industry during the 1989-1994 period, as broken down across four segments:

- Licences for systems and for applications products

EXHIBIT VIII-2



- Support revenues from contracted and non-contracted product maintenance activities

The software products sector is dominated largely by multinational vendors that have North American headquarters, although hundreds of European suppliers with niche market products operate in individual European markets. Major European systems and software houses have up to now been finding growth opportunities in the professional services and turnkey systems sectors because:

- These latter sectors permit the national European vendors to sell on more of a personalised service basis rather than on the basis of a standard product, hence capitalising on their close knowledge of local markets and their value-adding application skills.

However, the market is tending to favour the adoption of application packages and software product solutions, for a number of reasons:

- Falling hardware prices make the cost of tailored application software projects compare unfavourably with the cheaper, although often nascent, package product.
- Distributed processing is leading end-user management to expect shorter lead-times for its application programs than can be obtained by commissioning tailored software.

INPUT's 1989 research of the European software products markets brought to light certain key elements in user attitudes and current vendor practices:

- Users are less concerned today than in 1987 (when INPUT's previous report on this topic was researched) with the escalating expenditures on software and software maintenance.
- IBM's 1986 adoption of pricing software products according to the size of the host processor group running them has become the de facto standard in the industry.
- IBM's introduction of a policy of rebundling central support and maintenance for most software products into the licence fee has been followed by some—but by no means all—other vendors.
- Some vendors, notably Digital and Unisys, have preferred to bundle hardware and system software maintenance.
- Users find that:
 - Vendor application support is in limited supply and/or of low calibre.
 - Response and fix times are less satisfactory than they were in 1987.
- Charging for support and maintenance on software products was reported as less of a potential source of customer dissatisfaction than in the previous study because vendors have made strenuous efforts to formalise and streamline their support operations.

Exhibit VIII-3 shows how the content of applications product support contracts have developed during the previous two years:

- Most elements have increased their coverage. Except for discounting arrangements for new releases and training, most show significant increases with consulting visits and on-site fixes featuring most often.
- The use of an on-line problems database has spread to several vendors' offerings.

Exhibit VIII-4 summarises the support contract pricing practices as derived from the study's user research:

- Midrange users take out contracts in almost 90% of cases.
- The use of a support charge based on a regular annual or monthly fee outweighs the method of charging a percentage of the current list price for a product licence.
- Bundling of software support is not experienced by many users that go outside for application software maintenance.
- Support and maintenance contracts are charged at between 10% and 14% per annum of the equivalent one-time initial licence fee. This is a narrowing of the averages of the vendor ranges quoted in the survey as compared with INPUT's 1987 findings.

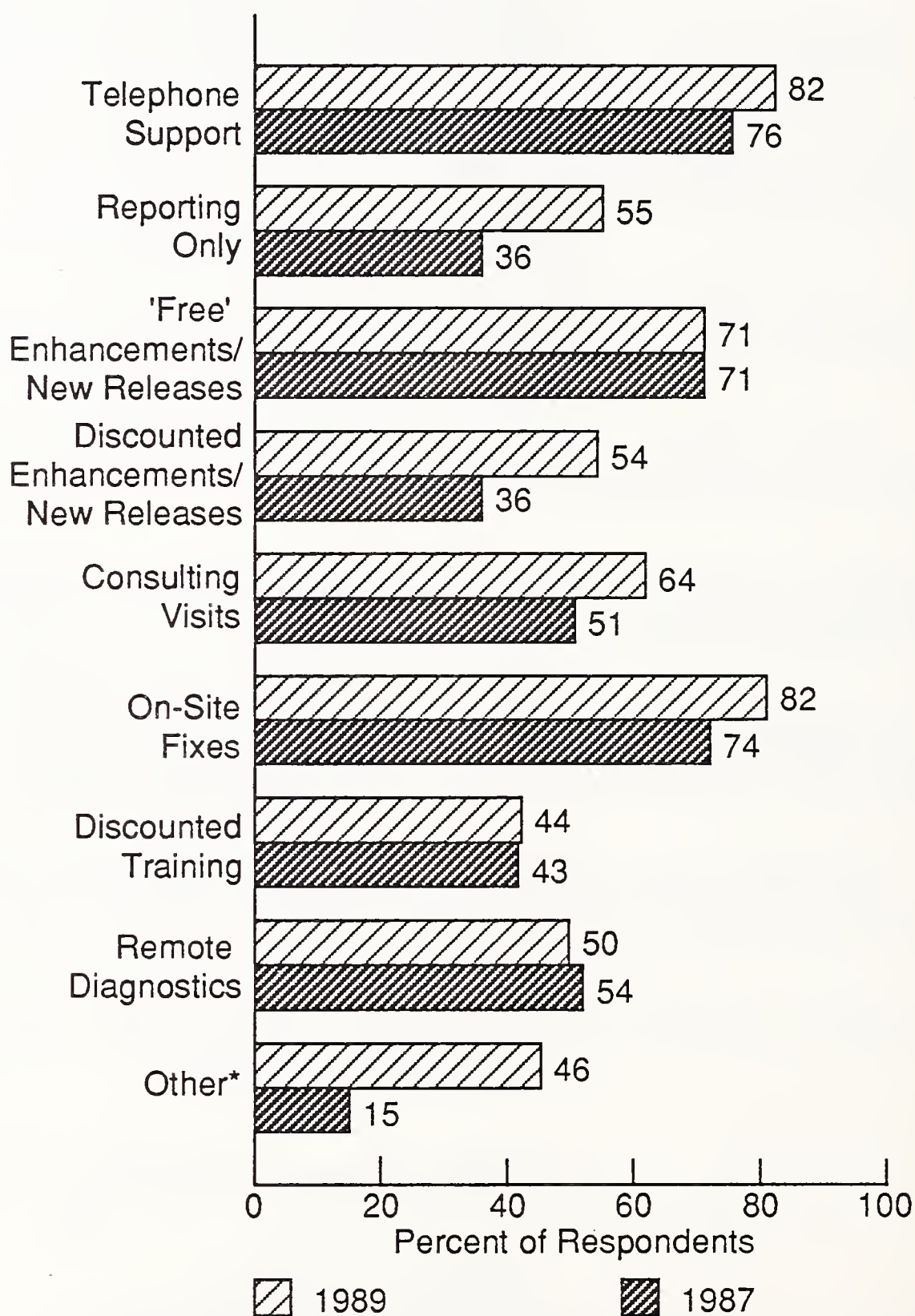
Among most user bases an unsatisfied demand for application services remains, which can be met in two ways (which can also be used in combination with each other):

- By providing more product support:
 - Chargeable (unbundled)
 - Free-of-charge (bundled)
- By offering chargeable professional services, for example:
 - Application support
 - Customisation of products
 - Installation consultancy and audit
 - Specialist training, etc.

Since INPUT's 1987 report many vendors, both equipment suppliers and independents, have initiated professional services marketing programmes to sell this type of service based on professional staff skill. In the midrange, however, the trend is for the rapid adoption of the applications package approach and many of the smaller systems and software houses

EXHIBIT VIII-3

User-Reported Applications Product Support Features



*Now includes problems database feature (@ 43% of respondents), newsletters, user group meetings and special offers

EXHIBIT VIII-4

Support Pricing

- On a contract basis — 88% of midrange users
- Unbundled with a regular fee — 61%
- As percentage of initial fee — 14%
- Bundled into licence fee — 2%
- Annual fee levels — 10% to 14% of one-time licence

that have specialised in this market segment will now need to implement sound support policies based on the best customer services practice.

C**Summary of Options**

The support and maintenance issues facing a software products supplier or an equipment supplier remain the same:

- Software systems will continue to be sold for a price determined by market conditions, numbers of target sales and a vendor's chosen market position.
- There will be a continuing need for ongoing software support contracts, which can be clearly perceived by users as justifiable against genuine service requirements.

Elements of extra service can more easily be sold in an equipment or integrated system sales situation, because they can more readily be perceived by the customer or user as distinct from the product or system sale. There are two basic approaches to this situation when it applies to a software product or system:

- Support contracts can be offered with differing levels of service and support built-in.
- In addition, professional services contracts can be offered to cover elements of service that are less clearly allied to the particular systems products being sold or installed, or that relate more closely to a particular user's application or to its system usage.

Exhibits VIII-5 to VIII-7 summarise INPUT's overview of the options available for software pricing and support:

- Software is classed according to its type (systems or applications) and here we have added a class for bespoke systems.
- The tabulated options are annotated with an asterisk where that option is INPUT's preferred for a particular software class.

EXHIBIT VIII-5

Viable Software Pricing Mechanisms

Factor	Systems Software	Applications Products	Bespoke Systems
Payment Method	<ul style="list-style-type: none"> • Bundled • Regular (M/Q/A*) Licence Fees • One-Time Fee • 2-Level Fee Scale** † • Leased with Hardware 	<ul style="list-style-type: none"> • Regular Fees • One-Time Fee • 2-Level Fee Scale** † 	<ul style="list-style-type: none"> • Purchase Price • With Discount for 2-Way Distribution Rights/Royalties†
Length of Contract	<ul style="list-style-type: none"> • 1 Year • 2 to n (≤ 5)** Years • Perpetual 	<ul style="list-style-type: none"> • 2 to n Years • Perpetual† 	<ul style="list-style-type: none"> • 1-Off Contract • Estimated Life-time of System (up to 10 Years)†
Multicopy Discount Policy	<ul style="list-style-type: none"> • Discount by Number of Processors • By Number of Clients • By Number of Sites 	<ul style="list-style-type: none"> • By Number of Processors • By Number of Sites • By Number of Modules† 	<ul style="list-style-type: none"> • Royalties for Internal/External Distribution
Usage Element	<ul style="list-style-type: none"> • Fixed Fee Irrespective of Platform • Graduated into Bands by Model/Processor Group and/or by Number of Users 		<ul style="list-style-type: none"> • Usage Royalty by Number of Users

*Monthly, quarterly or annual

**First-year fee and lower fee for second and subsequent years

†INPUT's most favoured mechanism

EXHIBIT VIII-6

Key Characteristics of Viable Software Support Offerings

Systems Software	Applications Products	Bespoke Systems
<ul style="list-style-type: none"> • Choice of Standard Contracts with Options • Choice of Total System Support (Price Attracts) • Contracts Include* Choice of: <ul style="list-style-type: none"> - Guaranteed Response Times - Upgrade Assistance Levels 	<ul style="list-style-type: none"> • Standard Software Maintenance "Contract" • Telephone Support Essential • Software Upgrades Policy* • Consulting Visits, On-Site Assistance Optional 	<ul style="list-style-type: none"> • Tailored Software Maintenance Contracts • Basic Level of Support Mandatory, if Not on 2-Level Pricing* • Perpetual Warranty Commands Premium
<p style="text-align: center;">Applicable to All Types of Software</p> <ul style="list-style-type: none"> • Single (with Locum) Contact Point; Premium for Multiple Contacts • On-Line Problems Database, as an Option (Self-Maintenance) • Time and Materials Rates (T&M) Remains the Floor Level 		

*Indicates the prime factor for each area

EXHIBIT VIII-7

Viable Support Pricing Mechanisms

Factor	Systems Software	Applications Products	Bespoke Systems
Payment Method	<ul style="list-style-type: none"> • Bundled with: <ul style="list-style-type: none"> - One-Time Fee - Regular Fee (M/Q/A) - 2-Level Fee* - Lease - Hardware Maintenance • Regular Charge: <ul style="list-style-type: none"> - Percent of One-Time Fee - Percent of M/Q/A Fee - Price per Product - Fixed Price All Products 	<ul style="list-style-type: none"> • Bundled with: <ul style="list-style-type: none"> - Regular Fee - 2-Level Fee* - Lease • Regular Charge: <ul style="list-style-type: none"> - Percent of One-Time Fee - Percent of M/Q/A Fee - Price per Product/Module - Fixed Price All Products 	<ul style="list-style-type: none"> • Bundled with: <ul style="list-style-type: none"> - Hardware Maintenance (i.e., System Maintenance) • Annual Fee - Renewable <ul style="list-style-type: none"> - Percent of Purchase Price - Price per System* - Fixed Price All Systems
Service Levels	<ul style="list-style-type: none"> • 2 Levels • 3 Levels • Either of Above with Options* 	<ul style="list-style-type: none"> • 1 Level with Options* • 2 Levels 	<ul style="list-style-type: none"> • Tailorable, Mix and Match
Multicopy Discount Policy	<ul style="list-style-type: none"> • Basic Fee Is for Single-User Contact Point 	<ul style="list-style-type: none"> • Basic Fee Is for Single-User Contact 	<ul style="list-style-type: none"> • Basic Fee Is for Single-User Contact
Length of Contract	<ul style="list-style-type: none"> • Follows the Length of Licence Period — Revocable with Notice • First-Year Warranty Cover (with Same Levels as Service) is Standard 		

*INPUT's most favoured mechanism

D**Recommendations**

Every effort must be made by vendors to apply the key principle of simplicity to the whole area of pricing and support:

- Pricing and support are two closely connected areas.
- There is an embryonic market for third-party software support, driven by the future requirement for one-stop shopping.

Vendors should initiate a review of the strategic implications of open systems on existing pricing and support policies.

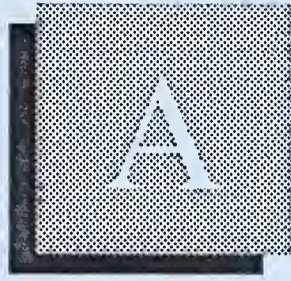
Maintenance of product and support of customers on an individual basis with specific professional services must be clearly distinguished in vendors' strategies.

Tactical bundling and unbundling of product and support offerings must be clearly situated within the framework of a total strategy. Otherwise these moves further confuse the potential purchaser.

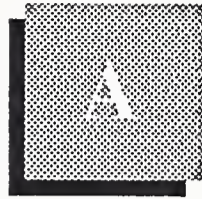
Our recommended preferred option remains as outlined in our 1987 report:

- Unbundling the functionality of products but bundling in their maintenance and support
- A combined two-tier licence fee in which:
 - The first-year fee level is set to cover initial development and implementation
 - The second- and subsequent-year fee level covers the costs of ongoing customer support and product enhancement

The fact that IBM is now test driving this approach is indicative of a realisation that simplicity aids marketing.



Appendix: Definitions



Appendix: Definition of Terms

A

Revenue

- *Captive Computer Services Revenue* - Revenue received from users who are part of the same parent corporation as the vendors.
- *Noncaptive Computer Services Revenue* - Revenue received for computer services provided from users who are not part of the same parent corporation as the vendor.
- *Other Revenue* - Revenue derived from lines of business other than those defined above.
- *Total Company Revenue* - Revenue received from total computer services and other sources of revenue.
- *Total Computer Software and Services Revenue* - Revenue received from services provided by vendors that perform data processing using the vendors' computers (processing services), assist users to perform such functions on their own computers (software products and/or professional services), provide a combination of hardware and software integrated into a total system (turnkey systems), include consulting, education and training, programming analysis, and facilities management (professional services), provide for systems design, integration and installation (systems integration), or offer network, enhanced management services, electronic mail, electronic data interchange, or electronic information services (network services).

B

Service Modes

- *Processing Services*
 - Transaction Services: uses vendor equipment and software at vendor site or customer site; may be interactive or remote-batch-oriented.

- Utility Services: access to basic software tools enabling the users to develop their own problem solutions (language compilers, assemblers, DBMS, sorts, scientific library routines, etc).
- Other Services: carry-in batch processing, computer output microfilm services (COM), data entry services, disaster recovery/backup services.
- Facilities Management (Systems Operations): vendor provides a complete operating information system for customer including equipment, software, personnel and facilities.
- *Professional Services* - Management consulting activity related to EDP systems consulting, production of custom software, education and training, and systems operations of client-owned computers (formerly identified as facilities management), where the vendor provides human resources to operate and manage the client facility.
- *Systems Integration* - delivery of large, multidisciplinary, multivendor systems, incorporating some or all of these functions: systems design, programming, integration, equipment, networks, installation and acceptance. Systems can encompass multiple product delivery modes.
- *Software Products*
 - Systems software and/or applications software packages purchased by users.
 - Systems Software Products

Systems Control Software: operating systems, communications monitors, network control, library control, windowing, access control, security, etc.

Data Center Management Software: capacity management, scheduling, job accounting, performance monitors, tape management, utilities, downtime/repair monitoring management, etc.

Application Development Tools Software: application generators, assemblers, compilers, 4GLs, automated documentation, languages, translators, database management systems, data dictionaries.
 - Applications Software Products

Cross-Industry Applications Software: used by clients in many or all vertical markets (i.e., payroll, word processing, spreadsheets, accounts receivable).

Industry-Specific Applications Software: unique to a specific vertical market and sold into that market only (i.e., demand deposit accounting, MRP II, hospital patient tracking).

- *Network Services*

- Network Management and Enhanced Services: network management functions, network transmission facilities, augmented with computerized switching and features such as packet switching, electronic mail, store-and-forward message switching, terminal interface and error detection and correction.
- Network Applications
 - Electronic Data Interchange (EDI): application-to-application electronic communication, based on established business document standards.
 - E-Mail: a range of services that transmits documents consisting of text and graphic material to be read by a person—with the quality of document being high.
 - All other application services in which the network is the principal part of the service, e.g., electronic funds transfer and some videotex services.

- *Electronic Information Services*

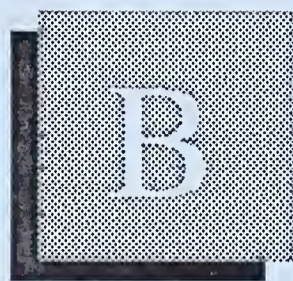
- Databases that provide specific information via terminal-based inquiry such as stock prices, legal precedents, economic indicators, airline schedules, etc.
- News services that offer current information, either general or for a specific category; i.e., financial or political
- Other services that provide interactive access to databases and offer the inquirer the capability to send as well as receive information for such purposes as home shopping, home banking, travel reservations, etc.

- *Turnkey Systems* - an integration of systems software, packaged or customized applications software, CPU, equipment, and peripherals. These systems are developed to meet a specific set of user requirements. The value added by the vendor is primarily in the software, either packaged or custom-developed. Most CAD/CAM systems and many small business systems are turnkey systems. This does not include specialized hardware systems such as word processors, cash registers, and process control systems.

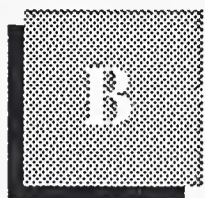
C

Other Considerations

When questions arise about the proper place to count certain user expenditures, INPUT addresses them from the user viewpoint. Expenditures are then categorised according to what users perceive they are buying.



Appendix: U.S. Dollar Average Exchange Rates



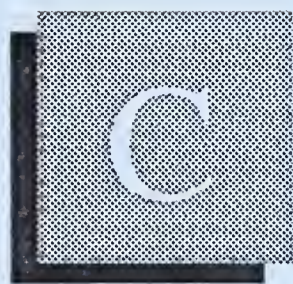
Appendix: U.S. Dollar Average Exchange Rates

EXHIBIT B-1

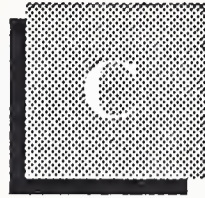
U.S. Dollar Average Exchange Rates

Country	Currency	Dollar Exchange Rate	1989 Inflation Assumptions (Percent)
		1989	
France	FF	6.55	+3.6
West Germany	DM	1.93	+3.0
United Kingdom	£	0.61	+7.8
Italy	Lit	1409.0	+6.5
Netherlands	DFL	2.18	+1.1
Belgium	BF	40.5	+2.9
Sweden	SK	6.55	+7.0
Spain	Pta	121.0	+6.5

Sources: IMF (average rates for second quarter 1989)
National Westminster Bank (November 1989)



Appendix: User Questionnaire



Appendix: User Questionnaire

(Relevant Questions to Software, Maintenance and Support Pricing)

I would now like to ask you some questions concerning the services you obtain to support your application software on midrange systems - i.e. IBM AS/400, DEC VAX, UNIX systems and workstations (NOT PCs)

Software Maintenance and Support

QU: 1 Who supports the application software? (Please give a ranking against each option, where 1=Most Important type of supplier of support, 2=Next Most Important and so on)

Ranking

Done in-house	_____
Hardware Manufacturer	_____
Software Product Vendor	_____
Systems/Software House	_____
Value-Added Reseller (VAR)/OEM)	_____
None of the Above (please specify) _____	_____

QU: 2 What is your rating of the importance of an application software support service to your business, and what is your satisfaction rating with your current support situation? (Please give a rating between 0 and 10, where 0=Zero importance/satisfaction, 5=Average and 10=Vital/Fully Satisfied)

Importance Rating _____

Satisfaction Rating _____

Comments _____

QU: 3a What percentage of your application products/systems are maintained or supported under each of the following charging methods?

Percentage	Charging Method	of Products
a.	Not maintained nor supported under a contract	_____ %
b.	Charged as a percentage of a one-time/initial licence fee	_____ %
c.	As a percentage of an annual/quarterly/monthly licence fee	_____ %
d.	At a fixed fee, dependent on system/product	_____ %
e.	At a fixed price, irrespective of product	_____ %
f.	Support is bundled into licence fee	_____ %
g.	other (specify) _____	_____ %
		100%

QU: 3b When support is charged as a percentage of the licence fee (in options b. and c. above) what range of percentages do you experience?

Minimum _____ % of licence fee Maximum _____ % Not Applicable _____ %

QU: 3c What range of prices do you experience in options d. and e. above, i.e., when charged a fixed fee (use local currency)?

From _____ To _____ Local Currency = _____

QU: 4a What features are included in your suppliers' application software maintenance contracts? (Please rate on a scale of 0 to 10, where 0=Never Included and 10=Always Included)

Maintenance Service	Rating
a. Telephone support/Hotline	_____
b. Telephone fault reporting only (re no fixes)	_____
c. Enhancements and new releases free	_____
d. Discounts on enhancements/new releases	_____
e. Consulting visits	_____
f. On-site trouble-shooting (fixes/patch installations/etc.)	_____
g. Discounts on training	_____
h. Remote diagnostics	_____
i. Problems Database access	_____
j. Other_____	_____

QU: 4b What is your major support problem with application products?

QU: 4c What other support services would you be prepared to pay for, either as part of an enhanced maintenance offering (bundled) or as separate support services (unbundled)?

	Bundled/Unbundled (B/U)
i) _____	_____
ii) _____	_____
iii) _____	_____

QU: 5 How do you rate your current suppliers of application products for the aspects listed - on a scale of 0 to 10? (Award a top rating of 10, down to a zero rating for appalling, for each of the aspects listed)

Aspects of the Products/Suppliers	Your Hardware Suppliers including Suppliers VARs/OEMS	Independent Software
a. Features of the software	_____	_____
b. Performance of the software	_____	_____
c. Ease of use	_____	_____
d. Documentation	_____	_____
e. Installation/Implementation services	_____	_____
f. Trouble-shooting	_____	_____
g. Ongoing product enhancement	_____	_____
h. Ongoing application support	_____	_____
i. Ease of modification	_____	_____
j. Training	_____	_____
k. Other _____	_____	_____

QU: 6a What trends in application software maintenance and support are you experiencing? Please tick if the trend affects you.

QU: 6b) Please also tell me for each how attractive it is on a scale of 0 to 10 where 0 has zero attraction and 10 rates exceedingly attractive?

Trend	Qu: 6a	Qu: 6b
a. More telephone problem solving	_____	_____
b. More remote diagnostics	_____	_____
c. More on-site problem of solving	_____	_____
d. Site discounting of support	_____	_____

- e. Other methods of discounting support _____
- f. Extended warranty periods _____
- g. Bundling service and product offerings _____
- h. Unbundling products or services _____
- i. Offers of third-party support _____
- j. Other (specify) _____

Comment: _____

QU: 7 What arrangements have you made against software loss or theft or against any of your suppliers going out of business?

Financial Information

QU: 8 At this stage I would now like you to give me some brief details covering your expenditure on computing services and application software in particular:

- a. Are you anticipating an increase in your total data processing expenditure during 1989?

Yes _____ No _____ Don't Know _____

If Yes, by what percentage in comparison with your spend in 1988?
_____ %

- b. Are you anticipating an increase in your expenditure on external software purchases during 1989?

Yes _____ No _____ Don't Know _____

- c. If Yes, by what percentage in comparison with your spend in 1988?

_____ %

QU: 9 For the following items which can be purchased externally, would you please indicate how much your 1989 expenditure is anticipated to increase in comparison with your expenditure in 1988?

Application Software Packages _____%

Application Software Maintenance _____%

QU: 10 a. Could you please tell me how much you anticipate spending on workstation application products and systems in 1989?

_____ Amount _____ Local Currency

Don't Know _____

b. Will this expenditure increase during the next couple of years?

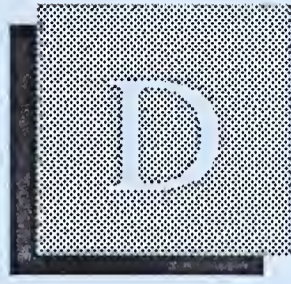
Yes _____ No _____ Don't Know _____

If Yes -

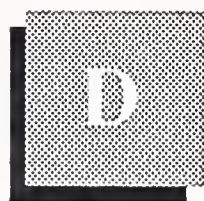
c. By what percentage in comparison with your spend in 1989?

_____%

We appreciate your cooperation in our survey and will send you a copy of the executive overview of our research findings.



Appendix: Vendor Questionnaire



Appendix: Vendor Questionnaire

General

- QU: 1 Which type(s) of midrange system are you actively marketing/working with:
IBM AS/400/S38 _____ DEC VAX MicroVAX _____
Workstation (Apollo, Sun, etc.) _____
UNIX minis (NCR, Unisys, Convergent, etc.) _____
Other (please specify, e.g., PICK, proprietary minis, DG, HP, etc.) _____

- QU: 2 What were your firm's European software products revenues for 1988?
_____ Financial year ends _____
- QU: 3 What percentage change over 1987 revenues did that represent? _____%
- QU: 4 Does the figure in QU 2. include support and maintenance?
_____ Yes _____ No

Product Profile

QU: 5 What percentage of the 1988 European software revenues came from each of the following categories of product?

	Mainframe	Midrange	Micro/PC
Subtotals	_____%	_____%	_____%
Application Software	_____%	_____%	_____%
System Software/Utility	_____%	_____%	_____%
Software Maintenance	_____%	_____%	_____%

[Interviewer: Note - Total must = 100%]

Pricing Structures

QU: 6 What percentages of your firm's software products were licenced in 1988 under each of the following charging methods? Please also rank your preference for each method (1=Most Preferred, 2=2nd Preference, etc.)

	System Software	Application Software	Preference Ranking
a. One-time initial fee	_____%	_____%	_____
b. Annual licence fee	_____%	_____%	_____
c. Quarterly or monthly fees	_____%	_____%	_____
d. 1st year licence fee with lower fees for subsequent years	_____%	_____%	_____
e. Other (e.g. Installment Plan, Usage pricing, please specify)			
_____	_____%	_____%	_____
_____	_____%	_____%	_____

Total Number of Licences Issues = =

Total Number of Licences Renewed = =

QU: 7 Please give details of 'usage' or any other innovative pricing plan which you use (e.g. the formula, when the plan started, success/failure, will extend)?

Support Pricing

QU: 8 What percentage of your users take out a maintenance contract? _____%

QU: 9 How does your company charge for software support and maintenance?

Charging Method	Approximate Percentage of Installed Base
a. As a percentage of one-time initial price/licence fee _____	_____%
b. As a percentage of monthly/quarterly/annual fee _____	_____%
c. Bundled into monthly/quarterly/annual fee _____	_____%
d. At a fixed price per product/system _____	_____%
e. At a fixed price irrespective of product _____	_____%
f. At T&M rates _____	_____%
g. Other (specify) _____	_____%
	100%

QU: 10a How many levels of support/maintenance do you have?

For System Software _____ Application Software _____

Comments _____

QU: 10b What services are included as part of your support contracts?

Service	System Software	Application Software
a. Telephone support	_____	_____
b. Fault Reporting	_____	_____
c. Enhancements/New releases free	_____	_____
d. Enhancements/New releases discounted	_____	_____
e. Consulting visits	_____	_____
f. On-site trouble-shooting	_____	_____
g. Discounts on training	_____	_____
h. Remote diagnostics	_____	_____
i. Problems database access	_____	_____
j. Other _____	_____	_____
_____	_____	_____

QU: 11a What range of prices do you charge for products maintained for an annual fixed fee (Options d. and e. in QU 9b)?

From _____ to _____ Local Currency= _____

QU: 11b What percentage of the equivalent purchase price are your maintenance and support fees (Options a. and b. in Qu:9.b)?

From _____% to _____% System Software

_____% _____% Application Software

QU: 12a How have these percentages changed over the past 6 months?

QU: 12b Do you anticipate them changing in the next 6 months?

QU: 13 How do the percentage support charges vary according to the presence of additional sites or processors, etc., i.e. what discounts are offered on support?

Support/Maintenance Fees as Percent of Price	From	To	Comment on Applicable Type of Software or Hardware
a. For additional sites	_____ %	_____ %	_____
b. For additional processors	_____ %	_____ %	_____
c. For additional modules/products	_____ %	_____ %	_____
d. Educational	_____ %	_____ %	_____
e. Other (specify)	_____ %	_____ %	_____

QU: 14 What other services are offered? (Prompts: training, software development)

QU: 15a Do you plan to include more support services in your future offerings?

Yes, in next 6 months _____ Yes, later _____ No plans _____

QU: 15b Please give details of positive bundling plan _____

QU: 16a Do you expect to see more, the same or less bundling of software services into maintenance contracts in the market-place during the next 12 months?

More _____ Same _____ Less _____

QU: 16b Please explain your perception of the trend

QU: 17 What other support pricing trends are in your view important? (Prompts: open systems, UNIX versions, software loss)

System Software _____

Application Software _____

QU: 18 What do you consider to be your toughest maintenance and support problems?

1. _____

2. _____

3. _____

QU: 19a Is your application support function a Cost Centre or a Profit Centre?

_____ Cost Centre _____ Profit Centre

QU: 19b If a Profit Centre, what profitability are you targetting/achieving?

Targetting _____ 0-10% _____ 10-20% _____ 20-30% _____ 30%+

Achieving _____ 0-10% _____ 10-20% _____ 20-30% _____ 30%+

- QU: 19c Which aspects of the operation are most 'burdensome' (i.e., difficult to estimate, difficult to control, high cost, etc.) Please rank each aspect listed from 1 downwards, i.e. 1=Most Burdensome, 2=Next Most Burdensome, and so on.

Aspect	Rank
Installation assistance	_____
Documentation	_____
Modifications/Enhancements	_____
Distribution of software	_____
On-site visits	_____
Other _____	_____
_____	_____

- QU: 20 How is your operation affected by the use/non-use/misuse of nonproprietary operating systems, i.e. UNIX, XENIX, PICK? (Prompts: standards, access to technical information, IBM's activities)

- QU: 21 Are there any other aspects of support and its pricing which have not been covered?

Thank you for your time.

